THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 44 DECEMBER, 1938 No. 3

INDEX TO CONTENTS

Some Newer Methods of Microstructural Investigation 143
By Alfred Salmony, Ph.D.

Developments in Rubber-Tar and Rubber-Resin Laboratory Research 149

Rubber in Furniture 151

New Peptizing Agent—RPA No. 3 153

Wollastic Rubberized Curled Hair 153

Akron's First Rubber Ball 154

Charles Goodyear (A Biography) 156
By P. W. Barker

Selenac—Vulcanizing Agent 158

New Equipment Section 159

REGULAR DEPARTMENTS

Late Domestic News	163	**Editorials**	162
Financial News	166	**Chemical Markets**	175
Book Reviews	161	**Statistics**	176
Los Angeles News	168	**Market Place**	180
Names in the News	169	**Advertising Index**	184
Rubber, Cotton Markets ..	173	**Classified Ads**	184

Also Publishers
of the
RUBBER RED BOOK
Directory of the Rubber Industry

THE RUBBER AGE, published on the 15th of each month by the Palmerton Publishing Company, Inc., at East Stroudsburg, Pa. Editorial and Advertising offices at 250 West 57th Street, New York City. Established 1917.

Entered as Second Class Matter, October 20, 1933, at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879.

Subscription Rates: Domestic, $2.00 a year; Canada, $2.50; Foreign, $3.00. Single copies, up to 3 months old, 25 cents; over 3 months old, 50 cents.

Telephone COlumbus 5-2923, 5-2924

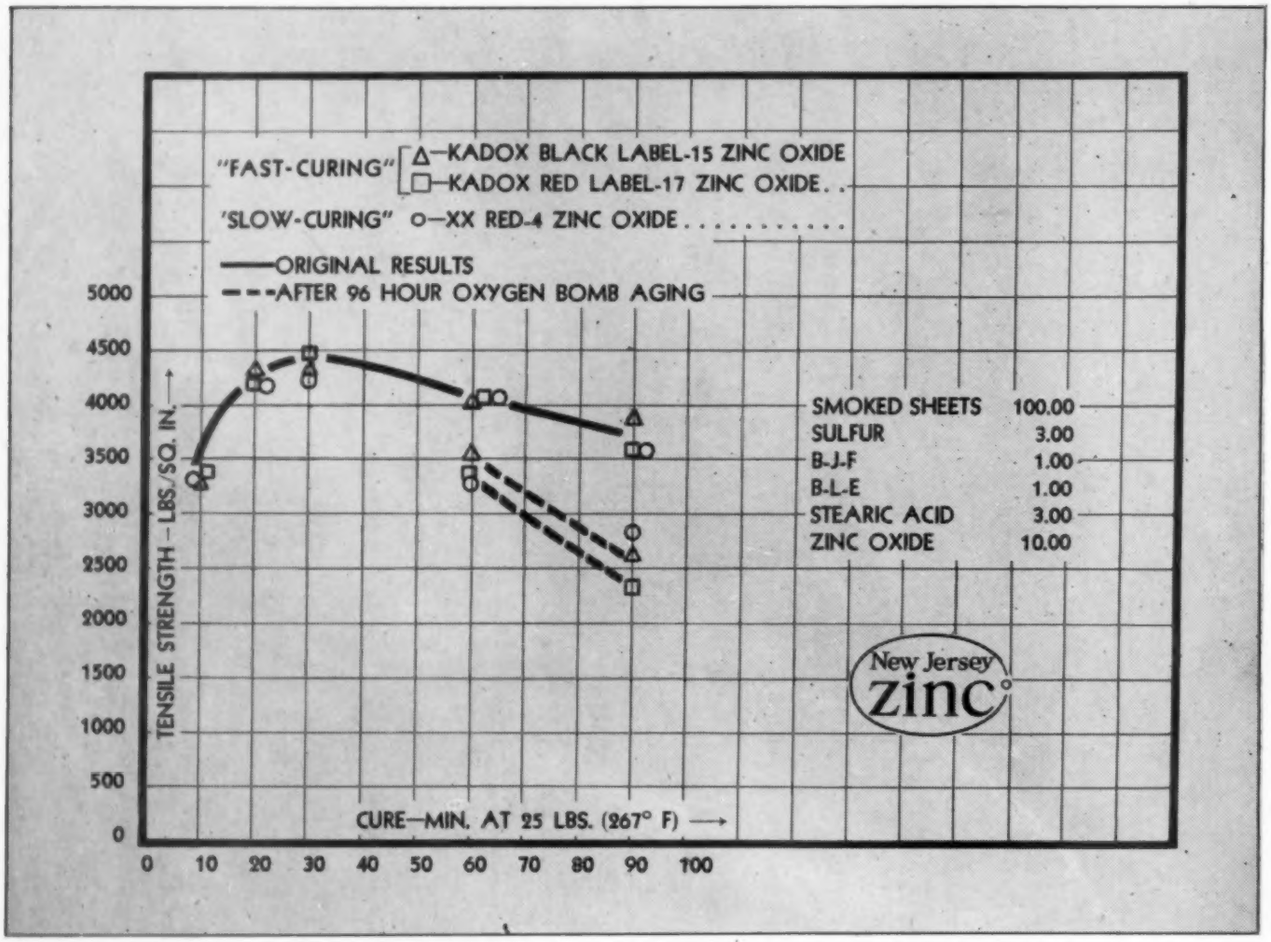
Contents Copyrighted 1938 by the Palmerton Publishing Company, Inc. Indexed in Industrial Arts Index.

PAUL L. PALMERTON.....President
E. D. OSBORN.....Vice-President and Sec'y
PETER P. PINTO.....Treasurer

M. E. LERNER.....Managing Editor
R. E. GAINES.....Circulation Manager
PETER P. PINTO.....General Manager

Activation of B-J-F Compounds

No. 64 of a series of charts showing a comparison of "FAST-" and "SLOW-CURING" zinc oxides with typical accelerators.



There is comparatively little difference in the effect of **Kadox Black Label-15**, **Kadox Red Label-17** and **XX Red-4** in the activation of a pure gum compound accelerated with B-J-F and cured at 267° F. **XX Red-4** appears to give somewhat better resistance to oxygen bomb aging on the overcure.

UNIFORM QUALITY ZINC OXIDES

THE NEW JERSEY ZINC COMPANY

The Rubber Age

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 44 December, 1938 No. 3

Some Newer Methods of Microstructural Investigation

A Review of Latest Developments in Europe in the Construction and Use of Various X-Ray Apparatus

By Alfred Salmony, Ph. D.

THE industrial demand for specific mechanical and chemical properties in various materials has increased to an astonishingly high degree in recent years. As a consequence of this increasing demand for uniformity of component materials the employment of modern and up-to-date methods of inspection and test has become essential. For many materials, the newer methods of conducting microstructural and macrostructural X-ray examinations, as well as improved methods of examinations with ordinary and camera-type microscopes, in which the test pieces are not destroyed but kept intact, are among the more important developments. Only a few years ago the so-called "Super-Microscope" was developed. This instrument makes possible magnifications up to *ca.* 60,000 diameters as compared with the 2,000 diameter magnification reached with ordinary optical microscopes.

The macrostructural X-ray method using the so-called Gamma rays of radioactive substances, especially of Mesothorium, is occasionally used for the detection of defects in new or used parts and is generally effective in determining the suitability or unsuitability of these parts for certain operations. Like the Roentgenographic X-ray examination, this method utilizes the characteristic property of X-ray to penetrate all substances to various depths, depending on the densities and specific gravities of these substances. The shadow picture of the object involved is thrown either on to a double-sided film covered with an emul-

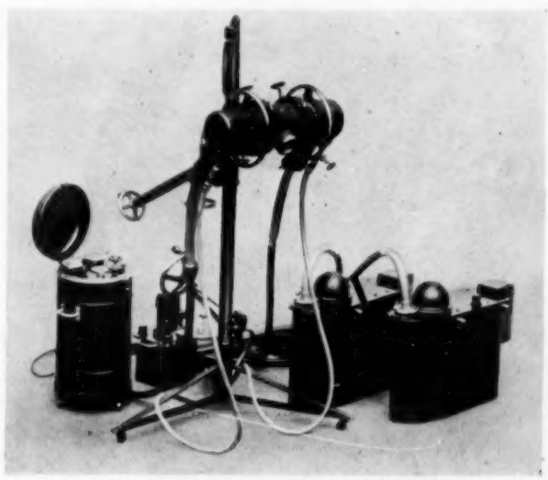


FIG. 1—X-ray apparatus for macrostructura examination.

FIG. 2 (left)—Reproduction of a rupture in the fabric of an automobile tire.

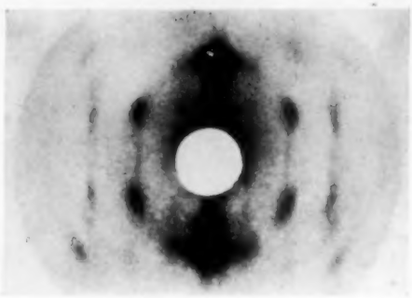


FIG. 4 (right)—Reproduction of a texture diagram taken of a fibrous material.

sion sensitive to light or on to a fluorescent screen. The Gamma rays method is generally employed only for testing of light metal parts.

The voltage of the Roentgen-tube is a governing factor in clearly depicting defects and in the depth of X-ray penetration of the test piece. The portable instruments developed some years ago, which possess a tube voltage of approximately 250 kV, permit complete penetration of copper up to 2.75-inch thickness, steel up to 3.90-inch thickness, and of light metal parts up to 11.80-inch thickness. More recently, X-ray apparatus has been developed which permit safe operation up to a maximum of 500 kV, and penetration of materials 50% thicker than those mentioned above has been accomplished. The penetrability of non-metallic substances, such as rubber, fabrics, wood, etc., is fairly high.

Fogging in the test piece, caused by the secondary rays, is counteracted by spreading-ray screens placed between the test piece and the film. These screens consist of thin layers lying one above the other, manufactured alternatively of lead and some substance penetrable to rays. The primary rays, which produce the image, penetrate straight through the screen, while the secondary rays spread out toward all sides and are largely absorbed by the lamella. Somewhat less efficient in the control of fogging are the heavy metal filters interposed between test piece and film which eliminate all secondary rays of greater wave length.

If Gamma rays are employed, a radioactive unit consisting usually of 30 mg of Mesothorium fused into a glass sphere of 1 mm diameter is used instead of the X-ray tube. Gamma rays possess much shorter wave lengths than the Roentgen rays and therefore exhibit a comparatively greater penetrating capacity, although due to their lesser intensity of radiation the films must be exposed much longer (approximately 100 hours) and consequently fluorescent screen observations are impossible with Gamma radiation.

Other disadvantages of the Gamma rays include the fact that in the case of comparatively thin test pieces defects are not as clearly recognized as they are with the Roentgen-tube, although this differential becomes inconsequential as the thickness of the test piece is increased. On the other hand, simple manipulation of Gamma ray apparatus is in its favor, as is the ease with which the radioactive unit may be handled to reach usually difficultly accessible places, especially in the testing of tires and tubes. This type of apparatus also requires but little maintenance attention.

One of the most efficient modern Roentgen instruments constructed in Central Europe is that shown in Figure 1. Constructed by Richard Seifert & Co., Hamburg, Germany, this apparatus can be mounted in any desired part of factory or laboratory. The reproduction of a rupture in the fabric of an automobile tire is seen in Figure 2. This photograph was obtained with the so-called "Isolux" apparatus, a 250 kV instrument of general applicability. Apparatus of this type has yielded satisfactory results in the examination of rubber articles, textile goods and electrotechnical products, as well as of operating engine parts, etc. Figure 3 is a reproduction of an "Isolux" instrument ready for operation.

FIG. 3—"Isolux" 250 kV apparatus.

The microstructural examination is now being widely employed in the practical inspection of rubber, fabrics, metals, alloys and numerous other materials. Briefly, this method may be defined as a systematic comparative study of the crystal-geometric structure of materials, of transformation processes, including processes involved in recrystallization and corrosion, and, finally, the determination of stresses and disturbances in the microstructure.

In 1912, the famous physicist von Laue discovered that when X-rays strike atoms they are diffracted, *i.e.*, deflected from their straight course. This deflection of X-rays can easily be demonstrated by a simple experiment using visible light, *i.e.*, if a narrow pencil of light rays emitted by a low voltage lamp penetrates vertically through a glass plate on which a dense lattice of parallel lines has been scratched by means of a diamond point, it is possible to observe, apart from the "primary ray" passing through the lattice in a straight line, a large number of "secondary rays" emitted laterally at a certain angle. This reaction of visible light is exactly the same as that observed when X-rays collide with atoms, if the atoms are united into crystals in a space lattice as is usually the case with most materials.

It is evident that X-rays striking an agglomerate of irregularly arranged atoms are dispersed in all directions. If these atoms are arranged in space lattices, however, the X-rays form diffraction pictures (or rather diagrams) of positively-arranged shape, permitting of the drawing of definite conclusions as to the relative positions of the atoms within the space lattice of a crystal. One such diagram, a texture-diagram of a fibrous material, is shown in Figure 4.

The comparison of microstructural-diagrams of new test pieces with that of standard test pieces will indicate whether a metallic or a nonmetallic body has been treated suitably by mechanical or thermal methods, whether it is adaptable for certain practical purposes, whether it is sufficiently corrosion-resistant to such corrosive agents as oxygen, acids, alkalies, etc.

By means of Roentgenographic microstructural examination, Esch has determined that carbon black manufactured in the United States consists of a skeleton of numerous carbon atoms and contains only 5% of graphite, while the ordinary inactive lamp black produced consists largely of graphitic carbon with a high degree of dispersability. The favorable effect of carbon black in rubber during vulcanization is due to its specific microstructure. (See: "Is Carbon Black an Amorphous or Crystalline Coloring Material," by W. Esch, *Kautschuk*, Vol. 14, No. 2, p. 30, 1938).

A material is considered micro-crystalline, especially in the case of metals, if "interference" lines or "Debye-Scherrer" lines are observed during testing. Such materials as glass, artificial resins, and the so-called synthetic rubbers (Buna, Sovprene, neoprene, etc.) are considered amorphous if the "interference" lines are absent. The existence of the so-termed "rolling or drawing texture" in metallic materials can be directly noted from the microstructural diagrams. If a single "interference" line remains uniform at any one position of the test piece, the micro-crystals are irregularly distributed.

However, if differences of darkness of an "interference" line symmetrical to the axis of the camera are observed, this is definite proof of a certain orientation of the micro-crystals such as might be caused by rolling or drawing treatments to which the material has been subjected. Re-crystallization, *i.e.*, the combination of single crystals into larger aggregates, can also be studied by means of microstructural examinations.

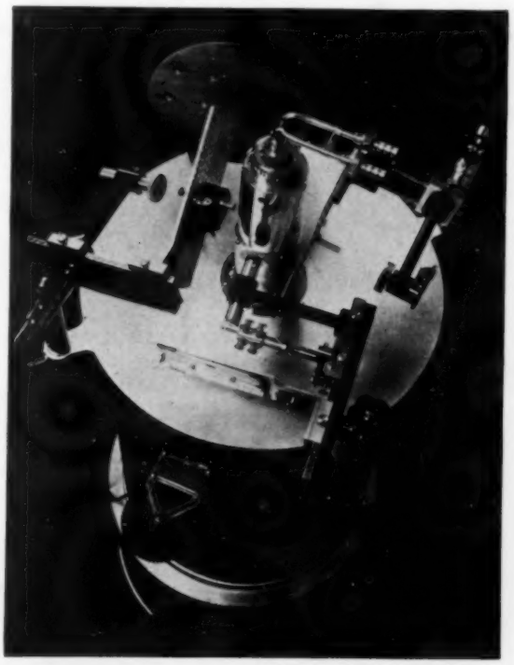


FIG. 5—Richard Seifert apparatus used for Roentgenographic microstructural examination.

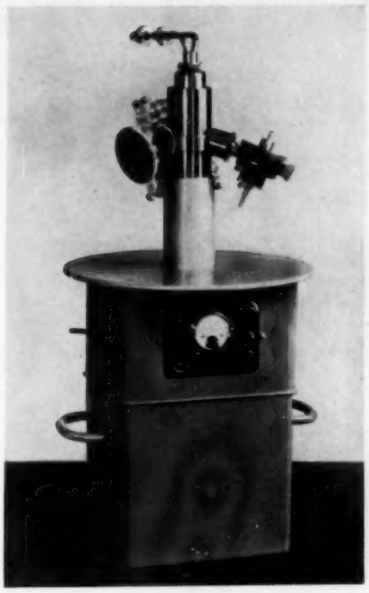


FIG. 6—Simplified Seifert apparatus

When it was realized that the examination of the microstructure of various materials could be of considerable importance to many manufacturing processes, because the structure of the space lattice indicated by X-rays is a determining influence on the technical properties of most metallic and non-metallic materials, it became necessary to develop testing instruments adaptable to practical service conditions. Instruments of this type had to be as small as possible, had to offer absolute protection against high tension currents and against rays, while the tubes used in connection with them had to be particularly efficient and easily transportable. Figure 5 shows one of the best instruments answering to these requirements. It is made by Richard Seifert & Company.

The transformer and heating accessories for the cathode filament of this Seifert instrument are included in the cylindrical case shown. The X-ray tube, in its high voltage-proof enclosure, is seen in the middle of the table. Easily adjustable exposure chambers can readily be arranged around this tube. The regulation accessories required are not shown in the reproduction. With this instrument it is possible to conduct microstructural examinations by the Debye-Scherrer, rotating crystal, reflection or Laue methods.

In another instrument designed by Seifert the regulation accessories are inserted in the case along with the transformer. This apparatus, seen in Figure 6, operates with four voltage steps, and is so small that it may be placed on a very small support for operation. The tube may be removed from the instrument and be joined to it by means of a high-tension cable, so that pictures of large or of difficultly accessible places may be secured. The so-called "Metalix" apparatus, developed by the N. V. Philips' Gloeilampenfabrieken, Eindhoven in the Netherlands, is seen in Figure 7. This instrument operates with two voltage steps, 35 kV and 42 kV. To simplify operation, it

FIG. 7—The type of tube used controls the voltage of this "Metalix" apparatus.

has been so designed that the voltage is automatically controlled by the type of tube employed.

In principle, all Debye-Scherrer photographs, with few exceptions, can be taken with copper radiation. For iron and steel examinations, a cobalt anode is recommended; for manganese, an iron anode is preferred; for texture photographs of metals, a molybdenum anode is best. For photographs of such nonmetallic materials as rubber, leather, wood, etc., a copper anode gives best results. No matter how carefully reproductions of original exposures are made, it is practically impossible to avoid certain imperfections from cropping up. These imperfections, very often totally irrelevant, are contributable to peculiarities of modern photographic printing methods.

The so-called "Super-Microscope" or "Electron-Microscope" is still in the development stage. Its operation is based on the application of rays of much

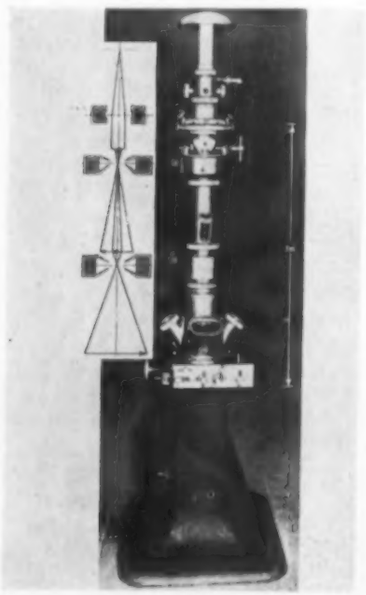


FIG. 8—The "Electron Microscope," with the path of the rays shown diagrammatically on the left.

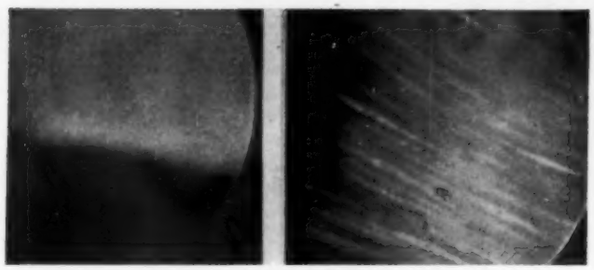


FIG. 9 (left)—Picture of an unstretched rubber membrane.
FIG. 10 (right)—Picture of a stretched rubber membrane.

smaller wave length than that of the light rays active in ordinary microscopes. While the wave length of the latter amounts to approximately 1/250,000ths of an inch, that of the electronic rays varies down to approximately one billionth of a millimeter, depending on the voltages (60,000 to 80,000) employed in their production.

In the "Super-Microscope," the function of the glass lenses in ordinary microscopes is performed by electrically responsive magnetic lenses, *i.e.*, round coils of special construction which shear or break the electronic rays passing through them in the same manner the visible light rays are diffracted in the glass lenses. The image produced by the electronic rays, invisible to the human eye, is then made visible. This change is effected by catching the image on an illuminating screen or a photographic film as described above for the Roentgenographic macrostructural analysis.

The almost incredible degree of magnification attained with the "Super-Microscope" has been made possible by the exceeding shortness of the electronic ray waves. One of the chief prerequisites to satisfactory operation of this apparatus is perfect constancy of the high electric voltage in a vacuum, since the electronic rays, being dispersed by the air moles, retain their speed only in a vacuum. Achievement of this phase was one of the main obstacles to the development of the present instrument. It is also necessary to protect the test piece under examination from the thermal effects of the electronic rays.

It was also determined that the glass object supports and covering glasses offered too much resistance to the passage of the rays, and collodion skins are now used in their stead. One of these new microscopes, which is approximately 7 feet high, is seen in Figure 8. The path of the rays is sketched diagrammatically to the left of the machine.

The development of the "Super-Microscope" or "Electron-Microscope" has enabled scientists to penetrate still deeper into the molecule world. By means of the fine adjustments embodied in this instrument it is possible not only to obtain sharp images of desired objects, but, as in the case of the modern camera-microscopes, to enlarge them tenfold or more. Beischer and Krause, in the course of colloid-chemical investigations involving the use of the "Electron-Microscope", were able to secure photographs of this type. (See: "The Electron-Microscope in Colloid Chemistry," *Angew. Chemie*, Vol. 51, No. 22, p. 331, 1938). Two of these photographs are seen in Figures 9 and 10.

Figure 9 is a picture of an unstretched rubber membrane (81,000 V; 1800: 1). It indicates that such membranes permit electronic rays to pass perfectly uniform. Figure 10 is a picture of a rubber mem-

(Continued on page 158)

ADVERTISING PAGES REMOVED

Developments in Rubber-Tar and Rubber-Resin Laboratory Research

THE Department of Scientific and Industrial Research, of England, undertakes specific research in cooperation with various industries. In 1934 the Rubber Growers' Association requested the Department to start an investigation into the possibilities of compounding rubber and its derivatives with tar and tar products with a view to establishing new uses for rubber. The results of this investigation, conducted by the Department's Chemistry Research Board, headed by Sir Gilbert Morgan (since resigned), at its laboratory in Teddington, England, covering a three year period, were given in the recently-published "Report of the Chemistry Research Board for the Triennial Period Ended December 31, 1937." Because of the importance of this investigation to the rubber industry, and the promise which the results hold forth for future applications of rubber, we are reproducing the complete section devoted to rubber research herewith. —Editor.

AT the request of the Rubber Growers' Association (London), an investigation on new applications of rubber, particularly in conjunction with tars, was begun in January, 1934. It was known that rubber was not compatible with high aromatic tars such as those derived from carbonization of coal in coke ovens or in horizontal retorts and that, although anthracene oil dissolved rubber, addition of pitch to such a solution immediately caused separation of the rubber. The problem, therefore, appeared to be that of developing a stabilizing medium for anthracene oil-rubber-pitch complexes, but it was thought desirable first to collect further data on the behavior of rubber with oils and pitches from other types of tar and to compare the relative solvent powers of comparable fractions from low temperature, vertical retort and horizontal retort tars.

Introducing Rubber Into Tar Oils

The introduction of rubber from latex into tar oils is best accomplished by the use of a colloid mill. When 40 or 60% unvulcanized latex is passed through such an apparatus with tar oils, an opaque viscous emulsion is formed which, on heating to 120° C. for 20 hours, is converted into a clear homogeneous solution owing to the removal of water and the gradual solution of the rubber in the oils. This prolonged heating, however, may be dispensed with by further application of the homogenizer, for if the first formed emulsion is passed from 8 to 10 times through the apparatus at 100° C. during a period not exceeding 15 minutes, the product becomes increasingly clarified with a corresponding decrease in viscosity, and the final solution is comparable with that obtained by 20 hours' heating of the emulsion in open vessels.

The amount of rubber which can be introduced in one run through the homogenizer varies with the type of oil. Low temperature tar oil can absorb 7 to 8% of its weight of rubber, whereas 5% is the maximum for anthracene oil. The final clear, limpid solutions can, however, be utilized as fresh starting material so that solutions containing up to 20% of rubber can ultimately be produced.

When pitch was added to solutions of rubber in tar oils, it was observed that, whereas the mixtures containing low temperature and vertical retort tar oils were stable, the corresponding products containing high aromatic oils showed a separation of rubber in the form of a coagulum. Furthermore, the stability of low temperature and vertical retort tar products was independent of the concentration of rubber or pitch; on the other hand, high aromatic oils are unsuitable as a medium for pitch and rubber when the former is in a greater concentration than 10% irrespective of the rubber content.

Behavior of Tars towards Rubber

It has been demonstrated that the differences in behavior of tars towards rubber can be accounted for by the fact that low aromatic tar oils are substantially of a paraffinoid nature and free from crystalline components with which high aromatic oils, such as anthracene oil, are saturated. Considerable improvement in the stability of high aromatic tars with rubber has been effected, therefore, by denuding anthracene oil of excess of crystalline material by refrigeration and employing the filtered oil as a medium for dissolving rubber.

Alternatively, the use of "dead" oil, which distills between naphthalene and anthracene fractions and is not saturated by crystalline constituents, furnished an improved medium for rubber-pitch mixtures. Still another alternative is to be found in the dilution of a high aromatic tar by an oil substantially free from solid hydrocarbons, such as are furnished by the products of distillation of low temperature tar.

Rubber-tar complexes similar to those derived from latex are obtainable from crepe rubber which, when milled in the presence of tar oils, is converted into a plastic material containing approximately 80% of rubber and 20% of oils. On heating at 100° C., this material can be readily diluted by additional oil when clear homogeneous, oil-rubber solutions are produced, and when pitch is added to such solutions, the resultant mixtures display the same characteristics as those already described.

Vulcanized rubber does not dissolve in tar oils but forms dispersions which, however, by suitable manipulation can be obtained as gels. When vulcanized latex and tar oil are passed through the colloid mill at 100° C., water is removed and a clear gel is produced. Such gels are obtainable from vulcanized latex and oils from any type of tar; moreover, addition of pitch causes no separation of rubber. The direct introduction of vul-

canized rubber into any type of tar is, therefore, possible by the blending of crude tar with vulcanized latex. Alternatively, when a gel of vulcanized rubber in tar oils is filtered, any desired concentration of gel is obtainable and this concentrated dispersion may be stirred directly into tars.

Oxidized forms of rubber recently introduced and known as "Rubbone," are readily compatible with all types of tar when blended at 125° C. for one hour. These new products are stable, homogeneous liquids of increased viscosity and adhesive power as compared with the original tar. Nitrite crumb rubber is moderately compatible with high aromatic tars and stable products containing 3% of this form of rubber have been prepared. With tars of paraffinoid type, nitrite crumb produces more satisfactory results.

Chlorinated rubber dissolved readily in tars or tar oils so that the blending of this rubber derivative with tars is very quickly effected by heating a mixture of the components to 100°C. for two hours. The most noteworthy feature of the products so obtained is a high degree of elasticity which is a novel property for tar products. The most satisfactory, smooth stable solutions are obtained with high aromatic tars and it was found that, as the tar oils became increasingly paraffinoid (exemplified by vertical retort and low temperature tars), so the stability of the final tar-chlorinated rubber product decreased. It is to be noted, therefore, that the behavior of chlorinated rubber towards the various types of tars is the converse of that of natural rubber, the former being readily soluble in "aromatic" tars and less soluble in "paraffinoid" tars. For this reason attempts to blend bitumen (petroleum distillation residues) with chlorinated rubber were unsuccessful.

An alternative method has been developed for the preparation of tar products containing chlorinated rubber. When chlorine was passed into solutions of rubber in appropriate tar media or into dispersions of vulcanized rubber in tar maintained at about 50°C., products were obtained resembling those furnished by direct solution of chlorinated rubber in tar oils. This method of chlorination *in situ* results in a material consisting of chlorinated rubber in chlorinated tar oils. When pitch was added, with the aid of stirring at 120°C., new blends of tar products were produced, exhibiting a high degree of elasticity.

Tested as Binding Agents

Chlorinated rubber-tar complexes have been tested as binding agents with various aggregates. In these experiments the stone filler was added to the tar product in the ratio of four to one and the mixture heated to 80° to 90°C. With all grades of granite ranging from chippings to dust the binding power was good and the cooled masses could not be easily disintegrated. When slight pressure was applied to the mixture, dense, well-bound blocks were obtained retaining the resilient features of the binder and this property was most noticeable in the blocks containing granite dust.

Rubber hydrochloride behaves similarly to chlorinated rubber in combination with tars, being readily soluble in high aromatic tars to yield homogeneous, stable products rather less elastic than the corresponding chlorinated rubber product. Since rubber hydrochloride is more susceptible than chlorinated rubber to high temperatures it is not advisable to heat the preparations above 120°C. during incorporation of this modified rubber with tars.

A series of products ranging from 90 parts of resin and 10 parts of vulcanized rubber to 10 parts resin and 90 parts of rubber have been prepared by the following method. Vulcanized rubber was precipitated in fine particles from "Vultex" (vulcanized latex) by the addition of ethyl acetate, filtered, washed thoroughly with acetone to remove the last traces of water, and dispersed in benzene. A measured solution of heat hardening resin in acetone was then added, care being taken that the ratio of benzene to acetone was three to one, and the mixed solvents removed under reduced pressure.

In preparations containing up to 50% of rubber, the material after removal of solvent consisted of a viscous homogeneous syrup which slowly hardened to a brittle mass as the last traces of solvent were removed. For molding purposes, these materials were powdered and sieved. When the preparations contained more than 50% of rubber, they could be disintegrated but not powdered. All these rubber-resin complexes were molded under pressure at 150°C. to yield products of increasing flexibility as the rubber content increased. From breakdown voltage tests it has been concluded that vulcanized rubber may prove a most valuable accessory in combination with heat hardening resins. A similar conclusion has been reached with respect to chlorinated rubber which can also be employed as a filler for such resins.

Chlorinated Rubber

At the present time much attention is being directed to the development of new uses of chlorinated rubber. One of the peculiar properties possessed by this material is that of assuming a vesicular form when, moistened with solvent, it is heated under pressure which is quickly released. This property has been utilized in the preparation of a series of laminated products. For this purpose sheets of linen were impregnated with a solution of chlorinated rubber in benzene or carbon tetrachloride and the solvent removed, when the sheets were submitted to pressure at 140°C. Products of varying consistencies were formed, depending on the time and release of pressure. For example, if the materials were allowed to cool under pressure, hard, dense boards were obtained, whereas if the pressure was released while the ingredients were hot, highly expanded laminated materials were produced.

The thermoplastic character of chlorinated rubber renders it eligible for use as a molding material over a range of temperatures from 100°C. to 150°C. In conjunction with various fillers, such as asbestos or wood meal, dense, hard machineable products of considerable strength are obtained. The most striking property of chlorinated rubber is that it can be utilized as a plastic without addition of any filler. When compacted under pressure of one ton per square inch at 115°C. to 120°C. for a short period, an opaque molding is produced when the pressure is released at this temperature. If, however, the pressure is retained while the mold is cooled to about 70°C., then a completely transparent molding is obtained.

The color of these transparent moldings is determined by the character of the rubber before chlorination. For instance, oxidized or degraded rubber yields moldings of the chlorinated derivative which are brown or yellow. With deproteinized rubber, however, from which these less stable resinous or albuminoid constituents are absent, the chlorinated rubber yields transparent, almost colorless moldings. Transparent films of chlorinated rubber are readily obtained by slow evaporation of benzene or carbon tetrachloride solutions.

Rubber in Furniture

Conclusions of a Survey Conducted by Givaudan-Delawanna, Inc., Which Proved that Rubber Has Definite Advantages in Furniture

FOR many years the house of John Wanamaker, in New York City, has enjoyed a reputation for quality furniture. Capitalizing on this reputation, the department store recently launched a series of advertisements informing the public how the furniture it sells was made. One of the advertisements appeared in the *New York Times* of August 29, 1938. It told why certain materials were selected for use, and others rejected. Referring to rubber, the copy was emphatic in stating that, "We don't use rubber and hair combinations" for the reasons that, "it may smell and is apt to pulverize after a while." This advertisement and its erroneous statements was called to the attention of the rubber industry in an editorial entitled "Continued Ignorance" which appeared in the September, 1938, issue of THE RUBBER AGE. The firm of Givaudan-Delawanna, Inc., manufacturer of industrial aromatics, which has worked closely with rubber manufacturers in the development of suitable aromatic materials to overcome all types of rubber odors, inspired by this editorial, decided to prove by means of a careful study of all phases of the subject that the Wanamaker statements were decidedly erroneous. Accordingly, it conducted an investigation among furniture manufacturers, rubber manufacturers, public service organizations concerned with furniture specifications, and obtained other information, and in our opinion it has proved that rubber has definite advantages in furniture. The results of the investigation, which took several months, were published in the November, 1938, issue of the *Givaudanian,* house organ of Givaudan-Delawanna, Inc., and we are pleased to reproduce the full report herewith.

A FEW months ago, a leading New York department store published an advertisement, telling how its furniture was made, giving details as to just why it used this material rather than that. Of rubber the ad stated:

"We don't use rubber and hair combinations. We think it's frightful to slap a sheet of rubber on the back of a chair, for even if it's loaded with talcum powder it may smell and it is apt to pulverize after a while. We upholster the backs and arms of our chairs with curled hair."

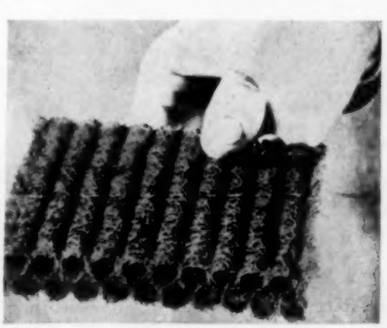
THE RUBBER AGE, trade paper for the rubber industry, in its editorial comments, expressed regret that such erroneous statements should be disseminated among the public after all the wide publicity which rubber anti-oxidants and reodorizers have received.

The *Givaudanian* felt that it might render a service by securing information from various sources which might clear up the subject under discussion. The result of the inquiry was that the conviction became inescapable that the department store in question was very ill-advised in publishing the statements it did since there existed no basis for its charges.

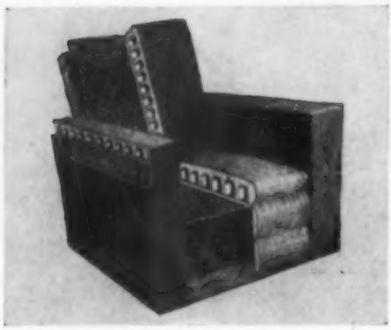
The first thing we did was to write to the store which published the ad. The furniture buyer referred us to the manufacturer who produces the store's furniture. The president of the manufacturing company enthusiastically supported all the charges made in the advertisement, but indicated that more recent improvements had eliminated some of the complaints.

Emphatically, however, this gentleman defied us to name any really custom built upholstered furniture manufacturer in the United States who uses this rubberized product on his furniture. He added, "We are quite sure that if you will take this matter up with the Better Business Bureau in New York, they will distinctly tell you that where furniture is made with rubberized hair, it does not come under the heading of 'custom built upholstered furniture,' and we doubt whether they will allow you to use that name in advertising in the City of New York."

Continuing his attack, this manufacturer said, "This rubberized hair, we believe to be particularly adapted for the cheaper grade of upholstered furniture." A little further on, he said, "It is true that rubberized materials are used on hospital mattresses. We will admit that a rubber mattress for a hospital would be



One layer of "Nukraft," rubberized hair made by Goodrich, seen at the right, is usually enough under all types of cushions.



One application of "Dunlopillo" in domestic furniture upholstery is seen here.

This picture of "Sorbo" cushioning, extensively used because of its resiliency, shows one of several applications of this type of product in furniture construction.

much better than a hair mattress, only on account of cleanliness. But as far as wear is concerned, we would we willing to bet an all-hair mattress would outlast a rubberized mattress by quite a good many years."

The Better Business Bureau of New York City decidedly did not agree with either the department store or its furniture manufacturer. It said, "No particular material used in any product qualifies such product as being 'custom built.' This term can only be applied to merchandise in which the customer purchasing it indicates the specification irrespective of the material used."

The tenor of the original advertisement and of the statements of the furniture manufacturer would give the impression that rubberized hair was a very cheap article of commerce, very inferior to hair filling, and that the public should be warned of such substitution. Further inquiry, however, showed that rubberized curled hair is about twice as expensive as ordinary curled hair and that its very high price is the principal reason why it is not yet extensively used. It also appeared that, if its price can be brought down somewhat, it may be adopted much more largely, but only in the *highest priced* upholstered furniture, and never in the cheaper grades.

But perhaps still more enlightening, and perhaps a little amusing too, was the discovery that the manufacturer who went so far out of his way to attack rubber and rubberized hair is himself a processor of hair and may therefore have legitimate reason for fearing the advent of rubber in furniture construction.

Beginning to Come Into Use

The Bedding Division of the New York State Department of Labor, when interviewed regarding the controversy, indicated that latex rubber foam and rubberized hair was only just beginning to come into use in the construction of furniture and that it certainly did not look upon these materials as cheap or inferior. It referred us to another furniture manufacturer who took us through his plant and admitted regretfully that he wasn't using as much rubberized hair as he would like to because it was so all-fired expensive. "But," said he confidentially, "if I was to make a piece of furniture for my own home, that would be just what I'd use. But I don't blame Mr. —— for discouraging people from asking for rubberized hair in their upholstered furniture. It cuts down our profits too much."

An executive employed by one of New York's large stores in charge of quality control had read the advertisement which started this inquiry and did not agree with it. He showed the writer numerous samples of latex air foam and rubberized hair. One had to put one's nose right on top of the material to discern any odor at all, and what odor there was, was not objectionable. Most likely some reodorizer had been incorporated into some of it without giving it any positive "perfumey" character. As to the material pulverizing, this executive had no evidence. For further details he referred us to some of the manufacturers. These responded nobly with accurate information.

Various Types of Cushioning

The Goodyear Tire & Rubber Company of Akron, Ohio, indicated that rubber is now finding rapidly increasing use and acceptance in furniture construction, and that the problems standing in the way of its earlier use were mainly technical and have been solved to a very large degree. Goodyear markets a cellular latex compound known as Airfoam, extensively used in cushions of all kinds.

Probably the most pleasing features of this material are its great porosity with inner connecting cells, which result in a sense of great coolness and comfort, its lightness in weight, and its ability to withstand an almost indefinite number of compressions and releases at a rapid rate, without breaking down. The product is substantially odorless, dustless and lint-free. This material is used in truck seats, pullman seats, club car seats, bus seats, arm chairs, household and hospital mattresses.

United States Rubber Products, Inc., Mishawaka, Indiana, makes a similar product which it calls "foamed latex sponge rubber." This is made directly from rubber latex and is broadly marketed in buses and automobiles, and as mattresses for hotels, hospitals, and private homes. The new streamlined trains are equipped with mattresses and seat cushions of this material. It is also being used in airplanes and high grade upholstery. A long period of experimentation was carried out to insure the product's satisfactory aging properties, freedom from objectionable odor, ability to give long service, and sanitary qualities.

The Dunlop Tire and Rubber Corporation, Buffalo, N. Y., makes a similar latex foam product, called "Dunlopillo" cushioning. It is used in thousands of busses and railroad passenger cars and has stood up very well in competition with springs, hair, etc. Dunlop's process for making cellular rubber precludes the possibility of odor in the material and ages exceptionally well. Some seats equipped with it have been in service in England for eight years.

Rubberized curled hair is made, among others, by the B. F. Goodrich Co. and by Armour & Co., Chi-

cago. The Goodrich product is trade-marked Nukraft; it is made of sterilized hair dipped in latex and formed into loops. Practically odorless, it has been found to last well over ten years without noticeable loss of strength or elasticity. It is used in seat cushions, bus and car seats, mattresses, and the finest upholstered furniture.

Data on Rubberized Hair

Very interesting data regarding rubberized hair were supplied to us by the sales manager of the Armour Curled Hair Works. First of all he cleared up the matter of the use of talc. "Talc is not used with the idea of eliminating odor," this gentleman stated. "A small amount is used only for the purpose of eliminating any stickiness or tackiness which may always be present to a slight degree in freshly vulcanized rubber.

"In the five years during which we have marketed rubberized curled hair, we have never had an odor complaint. It is true that all rubber products have a natural rubber odor, but this is so slight in rubberized hair that after this product is placed under a cover, it is practically impossible to detect any rubber odor whatever.

"Rubberized hair is more costly than ordinary curled hair. If we could produce rubberized curled hair at a price comparable to a fairly good grade of curled hair, it would be in use today by practically the entire furniture industry. We have made our greatest strides with rubberized curled hair as a decking material in the arms, platforms and backs, and this mainly in the higher priced furniture.

"Rubberized curled hair is nothing more nor less than ordinary curled hair dipped in a bath of compounded latex and then vulcanized to prevent oxidation. In other words, the curled hair is supplemented with latex, with the resulting product an improvement over either curled hair or rubber pads. It has been proven conclusively during the past five years that the theory of rubberized curled hair is sound.

"It remains only for us to devise methods for its production so that we can reduce our costs and sell the product at a price which will be more attractive to manufacturers of medium-priced or low-priced upholstered furniture.

"We note that the department store ad also mentioned the fact that rubberized hair may pulverize. We assume that they refer to oxidation. It is true that any rubber if exposed to light will eventually show various degrees of oxidation. We have not had our product on the market long enough to ascertain just how soon it will oxidize, but during the five years we have been marketing our product we have never as yet received one complaint as a result of oxidation of the latex.

"We do not use pure latex in the manufacture of rubberized hair. The product we use is a compounded latex containing, among other ingredients, certain antioxidants which, of course, are produced with the idea of retarding the process of oxidation. However, the fact must not be overlooked that even though some oxidation were to occur over a period of years in our rubberized hair product, the pad still would not disintegrate or collapse because we started with a curled hair pad in the first place. Some of the resiliency might be lost, but there would still be a curled hair pad there."

The fact that this investigation reveals that apparently odor is not a vital deterrent factor in the more widespread use of rubberized hair or sponge rubber in upholstery work is a tribute to the rubber manufacturers' development work.

Application of "Airfoam," made by Goodyear, to the seats featured in practically all of the new 1939 Hudson cars.

New Peptizing Agent—RPA No. 3

CONTAINING several new properties, a second peptizing agent has been introduced by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Wilmington, Delaware. Known as RPA No. 3, the new agent functions largely in the same manner as RPA No. 2, and is said to be equally effective in the same amounts.

The chemical composition of RPA No. 3 consists of 36½% xylyl mercaptan and 63½% inert hydrocarbon. In appearance it is a light yellow liquid, and has a specific gravity of 0.87. In gum stocks, the new peptizing agent activates slightly thiazole and thiuram accelerators. It has no effect in stocks containing 50 parts or more carbon black or in stocks accelerated with aldehyde-amines and guanidines.

RPA No. 3 is said to have excellent dispersion properties. It should be milled directly into rubber or mixed with a small amount of inert filler and added to rubber on a hot mill or in a Banbury. Sulfur retards the action of the new agent much less than it does RPA No. 2. Other compounding ingredients affect its action to approximately the same extent as they do RPA No. 2. The new agent softens crude rubber with resulting economy in time and power, materially improves the processing of stocks and is suitable for all types of compounds, and reduces the viscosity of cements.

Wollastic Rubberized Curled Hair

A NEW type of rubberized curled hair, called Wollastic Rubberized Vitacurld Hair, is being manufactured by F. P. Woll & Co., Frankford, Philadelphia, Penna. This product contains 50% of curled hair and 50% of latex, according to the manufacturer, and is made in sheets from 1-inch up in thickness. The company's standard sheet sizes are 2 x 6 and 4 x 6 feet, although special sizes up to 54 x 80 inches can be secured. In addition to sheet stock, the company also molds Wollastic into various forms and it is now being used for headrests and backs in busses, for backs and loose cushions in furniture, for cushions and mattresses in boats, and for all types of upholstery in airplanes.

Akron's First

SPONSORED jointly by the Women's Art League and the Chamber of Commerce, Akron held the first of what is planned to be an annual Rubber Ball, at the Hotel Mayfair in Akron on December 2nd. Mrs. Edgar Williams is credited with having first conceived the idea of using rubber in costumes, and the apparel worn at the Ball was worthy of her conception. The Ball had a two-fold purpose; one, it concentrated attention on the City of Akron, and second, the proceeds of the affair will be used to sponsor the careers of several young Akron artists.

C. W. Seiberling, of Seiberling Rubber, who acted as "King" at the Ball, read a royal edict to his "subjects" to the effect that they were never to ride on smooth tires, cut tire prices or indulge in tire price wars. Miss Jeanette Verheyden, elevator girl in an Akron department store, was selected as "Queen."

The Ball brought forth an amazing number of clever costumes made completely or partially with rubber products or derivatives, including "Pliofilm," the rubber-base product developed by Goodyear, which is transparent, odorless and non-inflammable, and "Koroseal," the synthetic plastic introduced by Goodrich.

Many of the Goodyear executives appeared in specialized costumes. L. E. Judd appeared as "Charles Goodyear," wearing side whiskers, a beaver hat and a rubber waistcoat. R. S. Wilson wore a costume featuring tire treads. C. M. Brooke appeared in a yellow rubber sou'wester. P. E. H. Leroy was resplendent in a tailored bright yellow suit with tails and top hat. Five executives of Goodrich, including Col. David M.

TOP: L. E. Judd, public relations director for Goodyear Tire, and Mrs. Judd, as "Mr. and Mrs. Charles Goodyear" in costumes of Pliofilm.

CENTER: Two members of Akron's younger set representing visitors from Mars, and another dressed in a costume resembling a rubber boot.

BOTTOM: R. S. Wilson, Goodyear vice-president, and Mrs. Wilson, attired in costumes of Pliofilm, made up to represent two garage mechanics.

BELOW: Miss Jeanette Verheyden, "Queen of the Ball," awarding the grand prize to Miss Doris Auman who wore a replica of a costume used in the days of Marie Antoinette.

Rubber Ball

Goodrich, son of the founder, wore formal rubber evening clothes, the first ever tailored from cloth impregnated with "Koroseal."

A group of Seiberling Rubber executives came to the Ball wearing top hats and rubberized capes, each with a cane and spats. When these executives lined up their costumes spelled out the caption "Boom Akron." A number of Seiberling Latex Products executives were also on hand, adorned in costumes resembling many of the Walt Disney characters featured in rubber by the company, including Snow White and the Seven Dwarfs. Other clever costumes included one representing a palm tree, with sponge rubber cocoanuts dropping from the wearer's hat, and another consisting of a huge black rubber boot with a small window provided in it so that the wearer could witness the proceedings.

The grand prize of $50.00 was awarded to Miss Doris Auman, of Akron, after long deliberation by the judges. Miss Auman was attired in a beautiful white rubber hoopskirted costume of the Mauve Decade. Judges included Count Alexis de Sakhnoffsky, famed designer, Miss Estelle Taylor, noted screen and stage star, and several local artists.

Because of the success of the Ball, it seems fairly certain that the pageantry of rubber will be repeated next year. Both the committee in charge of the affair and Akron rubber manufacturers expressed complete approval with the event. According to present plans, the annual rubber event will rival the famed Cotton Ball celebrated in Memphis, Tennessee, annually.

TOP: Mrs. P. W. Litchfield, wife of Goodyear's president, was attired in this formal gown which was made of vari-hued and filmy Pliofilm.

CENTER: Two interesting costumes on view at the Ball, one depicting a flower and the other most appropriately christened "Baldy the Slick."

BOTTOM: E. J. Thomas, Goodyear executive vice-president, wearing a full dress suit of balloon fabric, and Mrs. Thomas, in a Pliofilm dress.

BELOW: A view of the Rubber Ball at the height of activities, with C. W. Seiberling, "King of the Ball," seen in the foreground escorting his "Queen" down the aisle to the throne.

Charles Goodyear

CONNECTICUT YANKEE AND RUBBER PIONEER

By P. W. Barker

CHAPTER X

Discovery of Gold in California—Formation of Union India Rubber Company—Patent Litigation

TWO EVENTS occurred in 1848 which were to influence greatly the progress of the rubber industry: discovery of gold in California and the formation of the Union India Rubber Company. Although the discovery of vulcanization resulted almost immediately in a much improved rubber article, the general public was not so easily convinced that a radical improvement had been made in quality. It still remembered the poor performance of rubber shoes of pre-vulcanization days. Many of L. Candee & Company's rubber shoe salesmen were obliged to give away numerous samples in order to even obtain the interest of customers in the New England area.

Gold Discovered in California

In January, 1848, James W. Marshall discovered gold in quantities in California's Sacramento Valley on land owned by Captain John A. Sutter, and by the end of the year the East was aflame with excitement. Almost everybody wanted to trek to the Coast and join the feverish search for the precious metal. Ho, For California! was the motto of the day.

Several practical merchandisers in the East, however, took advantage of the gold craze to move their regular and special wares. They outfitted embryo prospectors with a hundred and one articles. Newspapers of this period were replete with advertisements offering such items as self-cocking revolving pistols, California medicine chests, and California gold scales with Troy weights. Included among these store-owners were many rubber goods merchants. It had been determined that rubber shoes and clothing worn in the gold fields stood up well under hard usage. This fact was emphasized in newspaper advertising employed by the rubber goods merchants and proved to be an excellent stimulus to the new industry. During the height of the gold rush hysteria, most rubber stores in New York were compelled to bar their doors time after time until admitted customers had made their purchases and departed.

NOTE: This biography of Goodyear started in our April, 1938, issue.

Horace H. Day, during this period, was selling a rubber boat at his store in New York at 23 Courtlandt Street. According to his advertising, it was a "Patent India Rubber Boat which can be converted in a few minutes (as now made) into a most convenient Tent (more like a house with windows than an India Rubber Tent)." The advertising also claimed that, "With this boat Colonel Fremont crossed rivers, navigating their rapids—surveyed a portion of the great inland Salt Lake." Prices ranged from $40 to $75, and a boat made to accommodate six passengers weighed 75 pounds, including such accessories as mattresses.

Colonel John Charles Fremont (later General) did use Day's rubber boats, one in August, 1842, while surveying the River Platte, and another in September, 1843, on the Great Salt Lake in Utah. Kit Carson, famous American scout and guide, was one of the Salt Lake party. Fremont tells of Day bringing the first boat to Washington, D. C., in 1841, and personally unpacking it. The seams of this boat were sewn and it was not vulcanized, because the army officer comments on its very disagreeable odor. The second boat, that used on the Great Salt Lake, was not sewn at the seams. The seams, however, gave way on the Lake and the entire party had to assist in bailing efforts to keep the boat afloat.

Rubber boats and pontoons were not unknown at this time. They had been made as early as 1836 by the Roxbury company, and Goodyear had made some in 1837. In fact, the inventor produced rubber boats and pontoons practically in every year after 1837 up until the time of his death.

Hodgman Sold Rubber Clothing

Daniel Hodgman's store at 27 Maiden Lane, New York, was virtually headquarters for rubber wearing apparel of all kinds—from hats to shoes— for use in gold mining activities. Hodgman had obtained U. S. Patent No. 2504 for an "Overshoe," and he strongly advertised these shoes throughout 1848. They were "manufactured from Goodyear's metallic rubber" and

the user was assured that they would "retain their brilliancy of gloss, will not stiffen in cold weather, and are extremely light and durable."

From 1848 to 1850 Hodgman covered a surprisingly large number of rubber articles in his advertising. Although stage coach journeys to California at this period must have been unbelievably arduous, there is little doubt that some comfort was afforded to weary travelers by air cushions of rubber, rubber clothing and rubber footwear.

Other merchandising firms participating in the rubber goods trade in New York during the height of the gold rush fever included the following: New Brunswick Rubber Co., Nassau Street and Maiden Lane (shoes); Newark India Rubber Manufacturing Co., 59 Maiden Lane (shoes); B. F. Breeden & Brothers, agent for Ford Rubber Co., Cliff Street, between John and Fulton Streets (shoes); Hayward Rubber Co., operating as an agency, Pearl near Fulton Street (shoes); Goodyear India Rubber Glove Co., John Street (gloves); and the New England Car-Spring Co., Broadway near Wall Street (car springs).

Formation of Union India Rubber

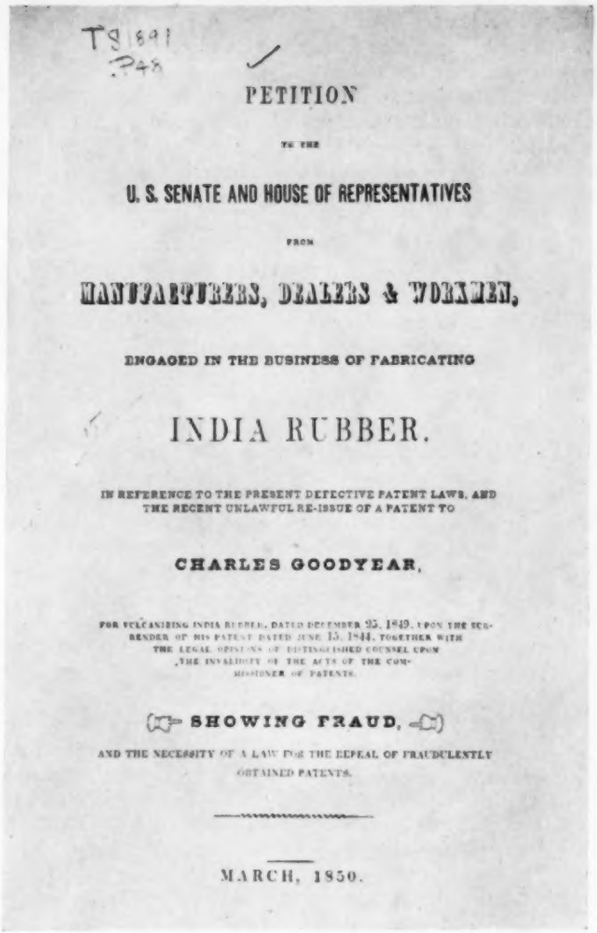
Far more important to Charles Goodyear than the discovery of gold was the organization of the Union India Rubber Company. Chartered on August 22, 1848, for twenty years, under the general manufacturing laws of New York, the new company was capitalized at $250,000. Trustees were Jonathan Trotter, Elihu Townsend, Nicholas Dean, William Rider, and Emory Rider. Stock in the amount of $200,000 was issued for patents, licenses and merchandise, while the remaining $50,000 covered preferred shares sold for cash. James Bishop, shipping merchant and importer of crude rubber, of New Brunswick and New York, subscribed practically to all of the preferred shares.

On December 4, 1848, four contracts were drawn, transferring to the Union India Rubber Company the several licenses of its more important organizers. These licenses, with stock consideration stated, were as follows: (1) License of July 18, 1844, granted by Charles Goodyear to the Naugatuck India Rubber Co., general rubber products, $50,000; (2) License of February 5, 1847, granted to Jonathan Trotter, wearing apparel, $25,000; (3) License of March 28, 1847, granted to W. Rider & Brothers, mail bags, $20,000; (4) License of July 1, 1848, granted to Jonathan Trotter and W. Rider & Brothers, army and navy equipment, $45,000.

Jonathan Trotter was the first president of Union India Rubber. Factories were located at Naugatuck and Harlem. Rubber goods of all kinds, with the exception of shoes, belting, packing and hose, were manufactured. A retail store was opened at 19 Nassau Street in New York in time to equip hundreds of "Forty-niners" for their emigration to the Pacific Coast. Although operations of the new company were large for that period, compare its consumption of 140,000 pounds of crude rubber in 1854 with the annual consumption of any large rubber manufacturing company of today!

Importance of the Union India Rubber Company to Charles Goodyear was similar to that of the Goodyear Shoe Association in that it furnished him with almost unlimited facilities for experimentation and concentrated licenses in a friendly group for group protection against patent infringement. And difficulty over infringement of patent was just around the corner.

Goodyear was very much engaged in experimental



TS 1891
.P48

PETITION

TO THE

U. S. SENATE AND HOUSE OF REPRESENTATIVES

FROM

MANUFACTURERS, DEALERS & WORKMEN,

ENGAGED IN THE BUSINESS OF FABRICATING

INDIA RUBBER.

IN REFERENCE TO THE PRESENT DEFECTIVE PATENT LAWS, AND THE RECENT UNLAWFUL RE-ISSUE OF A PATENT TO

CHARLES GOODYEAR,

FOR VULCANIZING INDIA RUBBER, DATED DECEMBER 25, 1849, UPON THE SURRENDER OF HIS PATENT DATED JUNE 15, 1844, TOGETHER WITH THE LEGAL OPINIONS OF DISTINGUISHED COUNSEL UPON THE INVALIDITY OF THE ACTS OF THE COMMISSIONER OF PATENTS.

SHOWING FRAUD,

AND THE NECESSITY OF A LAW FOR THE REPEAL OF FRAUDULENTLY OBTAINED PATENTS.

MARCH, 1850.

Facsimile of the petition sent to Congress by Day alleging fraud in connection with the Goodyear patent

work in the period from 1844 to 1850. Every one of the patent licensees opened up their works to the inventor and he kept moving from one place to another: first to Naugatuck, then to Harlem, on to Newark, over to New Brunswick, and back home again to New Haven. The family had moved to New Haven in 1845, and in the same year Goodyear lost his mother and his brother, Robert.

At this time of his life, the inventor is described as being "small, thin, sallow, nervous." He rushed his experiments as though the end were at hand. His belief that he would live to finish his work, however, never left him. To those who were always indicating impossibilities to accomplishment he stated, "Don't be seeing all the difficulties that may occur. If it is to be done it must be done, and it will be done." Another constant urge to endeavor is noted from his oft-repeated statement, "Somebody will yet thank me for it."

The very essence of Charles Goodyear's philosophy of life appears in *Gum-Elastic:*

> "I am not disposed to repine, and say that I have planted and others have gathered the fruits. The advantage of a career in life should not be estimated exclusively by the standard of dollars and cents, as is too often done. Man has just cause for regret only when he sows and no one reaps."

This expressed philosophy indicates the grand spirit of this small man who accomplished his purpose in

life, who never wrote an ill word of his enemies no matter how great the harm they caused.

When a man has devoted part of his life to the achievement of some particular problem, the answer to which benefits mankind as a whole, it would seem only fair that he should be permitted to live out the rest of his days in comparative peace. So often the opposite is true, and it was especially true in the case of Charles Goodyear. Although he had overcome physical debility and driven himself forward for ten years in the face of poverty and public ridicule before discovering the elusive secret of vulcanization, the inventor was not permitted a moment's peace near the end of his life in which to enjoy the fruits of his labors. No man had a more energetic or relentless adversary than did Goodyear in Horace H. Day.

Horace Day Harassed Goodyear

Day was granted exclusive license in 1846 to one of the most profitable branches of rubber manufacture of the time, that of shirred goods. Yet he was not satisfied. He must have been stung to the quick by his failure in 1844 to obtain the vulcanization patent for himself. Whatever the reason, Day was merciless in his efforts to harass the inventor. He refused to pay license fees, generally infringed the patent, and claimed that the patent was fraudulent and void.

In 1850 Day went so far as to petition Congress to declare the vulcanization patent illegal. Goodyear and his associates, in an effort to avoid expensive litigation, offered to purchase Day's entire rubber manufacturing plant. A price of $30,000 was set, but when this amount was met Day raised the price to $40,000. Goodyear made an inventory of the plant and then retracted the offer to meet the first price tendered.

Probably the claim of fraud in connection with his patent aroused the inventor more than anything else, for he immediately made arrangements with his counsel, Seth Staples and William Judson, to prosecute Day for infringement of patent and to seek damages. When a mild mannered and gentle individual like Charles Goodyear becomes aroused, provocation must indeed be great.

Hayward Failed to Dissuade Day

Nathaniel Hayward had tried to dissuade Day from his bothersome tactics. In a letter sent from Lisbon, Conn., dated October 7, 1845, Hayward wrote:

> "My advice to you is, to settle the matter, and not persist in, or pursue the matter of the patent any further, inasmuch as the matter must upon sustaining, or not sustaining the patent, be or not be destructive to one or another of the parties."

But settlement by peaceful means was apparently not to Day's liking. He insisted on a legal decision, preferably in his own favor of course, and he was to get a decision at Trenton, N. J., in 1852, but one which he would not relish. Goodyear realized the importance of a decision in his favor, and all of his tremendous energy was directed toward the prosecution of the alleged infringer. Both Goodyear and Day, together with their legal advisors, were busily occupied during 1850 and 1851 with the taking of depositions from practically everyone who had been engaged in the early rubber trade and industry. The stage was being set for the greatest legal battle of the country up to that time. It was truly to be a battle of giants.

(To Be Continued)

Selenac—Vulcanizing Agent

A NEW vulcanizing agent, effective in the absence of added sulfur, has been added to the line of rubber chemicals featured by the R. T. Vanderbilt Company, 230 Park Avenue, New York City. Called Selenac (selenium diethyldithiocarbamate), the new vulcanizing agent is an odorless, golden yellow powder of 1.3 specific gravity and melting point of approximately 93° C. It is fairly easily soluble in benzene, acetone and many other organic liquids, but is sparingly soluble in gasoline and petroleum hydrocarbons.

Selenac is said to have good aging properties, showing remarkable results in moderate oxygen bomb and air pressure heat tests. It allowed practically no deterioration during 96 hours in the oxygen bomb (70° C. and 300 lbs. oxygen) or during 5 hours in the air pressure heat test (127° C. and 80 lbs. air). As far as scorching is concerned, Selenac is said to compare favorably with low-sulfur combinations. It is definitely less scorchy, according to Vanderbilt, than most fast curing compounds containing sulfur ratios around normal.

Because of its chemical constitution, Selenac is said to offer a means of getting selenium into rubber compounds in a rubber-soluble form. The low proportion of active sulfur contained in this new vulcanizing agent makes it well adapted for use in non-tarnishing and free-stripping wire insulation or in other places where tarnishing of metals is to be avoided, such as in automobile headlight gaskets.

Despite its low content of sulfur available for vulcanization, Selenac is not sluggish as a vulcanizing agent, according to its manufacturer. Because the action of its sulfur is supplemented and reinforced by the effect of its selenium, this new ingredient is really a fast curing vulcanizing agent.

Microstructural Investigation

(Continued from Page 146)

brane stretched approximately 800% (79,000 V; 1900: 1). The light streaks seen in this photograph are 0.5 to 0.75 μ wide and approximately 20 μ long. To secure these photographs, a thin layer of latex was spread over an ordinary glass object support. The support was later cut in half without damaging the dried latex film and the two pieces pulled apart so as to obtain the stretching effect desired. The thickness of the original film was similar to that of a single drop of latex, *i.e.*, 1 to 2μ.

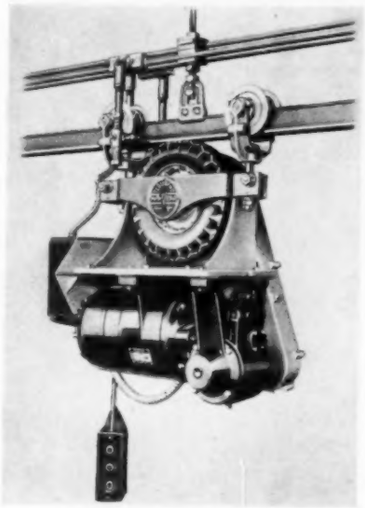
The spindle-shaped light streaks or strips seen in Figure 10 probably represent stretched latex moles, and it has not yet been determined whether the rubber membrane is thinner at the points indicated by the light strips or whether the strips are due to rubber crystallites. In either case, the light strips were caused by deeper penetration of the electronic rays. In any event it is striking that, according to Sauter, corresponding photographs have been obtained by microphotography of stretched rubber in polarized light with crossed Nichols prisms. Sauter believed the light strips to be due to layers within the rubber-single-crystal. (See: *Zeit. f. phys. Chemie,* Abt. B, 36, p. 405, 1937).

Further development of the "Electron-Microscope" is expected to result in a solution of the problem regarding the differences in the microstructure of natural and synthetic rubber, as well as problems of vulcanization processes in which sulfur, selenium, or mixtures of both, are utilized.

New Equipment

Louden MotoVeyor

SAID to be the latest development in a powered machine for automatically transporting loads over an overhead track system, the Louden MotoVeyor has been announced by the Louden Machinery Co., Fairfield, Iowa. The new machine negotiates inclines and maintains uniform speed going down grade. The range of speed which can be provided is from 60 to 600 feet



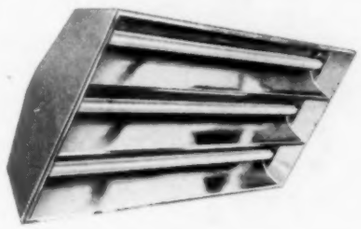
per minute. It may be built into cab or step-on platform so the operator can accompany loads if desired, or it may be used in power-driven cranes. The simplicity and efficiency of the MotoVeyor is said to lie in the fact that a rubber tire is utilized for the drive wheel. The drive shaft is supported in precision ball bearings located on each side of the wheel. The main frame is cast in one piece, with the motor mounted under the frame. The complete unit is perfectly balanced without the need of counterweights or other additions to make it hang plumb. Its use, according to the manufacturer, reduces handling costs to the minimum.

New Type Conveyor Drive

A NEW type of conveyor drive, termed the "floating drive," which is said to result in a minimum total belt tension commensurate with the load being conveyed, is being featured by the Mathews Conveyor Company, Ellwood City, Penna. Whereas the conventional method dictates that the drive be located at the head end of a conveyor, the new driving mechanism, developed by H. W. Wylie, a Mathews engineer, can be located at any point along the length of the belt conveyor. This feature is said to afford considerable flexibility and to permit compactness in laying out a conveying system. Tests made of installations equipped with "floating drives" indicate that the average belt tension is 30 to 40% less than in the conventional head-end, take-up type of belt conveyor, according to the manufacturer. Belt conveyors using the "floating drive" are made level, inclined, or declined, or in combinations of all three. They are available in belt widths from 6 to 30 inches, maximum belt pull up to 500 pounds, and up to 3 h.p.

"Daylight" Lighting Units

ESPECIALLY designed to utilize the unique lighting characteristics of the recently introduced "Daylight" white fluorescent lamps, a line of lighting units has been introduced by the Benjamin Electric Manufacturing Co., Des Plaines, Illinois. Known as "Daylight" Fluorescent Lamp Diffusers, the new lighting units are said to provide heretofore unobtainable efficiency for lighting operations requiring accurate color discrimination. These lamps have nume ous



industrial and commercial applications. A minimum of 100 footcandles of daylight quality light of 6500 degrees Kelvin color temperature rating can be uniformly distributed over an area 3 x 4 feet when a 36-inch lamp unit is suspended 30 to 36 inches above the surface; a proportionally lower intensity over a relatively smaller area is provided by an 18-inch lamp unit. Each lighting unit is arranged for three lamps, and since these special lamps are essentially mercury arc sources, auxiliaries are built into the units to permit operation on standard lighting lines. The reflector of each unit is of polished aluminum, and individual troughs are provided for the three lamps. Because of the low surface brightness of the lamps and practically complete absence of radiant heat, the lighting units may be located low over the working plane, and even in the direct line of vision, without discomfort.

Ellwood Shin Protector

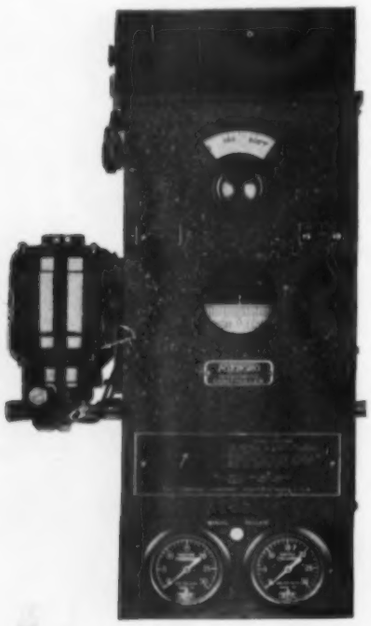
AN improved shin protector, which can be worn with comfort either outside or inside apparel, has been developed by the Ellwood Safety Appliance Co., Ellwood City, Penna. Each shin guard is made

of fiber formed to the contour of the human leg. Three horizontal ribs are employed for added strength and rigidity. Four brass eyelets, two at each side, are used to accommodate two straps for attaching the

guard in position. A molded sponge rubber pad is used at top and bottom of each guard between the inside of the guard and the wearer's clothing, effecting a cushion which gives added comfort and also acts as a shock absorbing device. The new guards are said to allow absolute freedom of leg and foot action while giving maximum protection to the shins.

Potentiometer Control Pyrometer

DESIGNED to actuate air-operated valves which are unaffected by dampness, oily vapors and corrosive atmospheres and which are free from arcing and sparking electric contacts, a new potentiometer control pyrometer has been introduced by the Foxboro Co., Foxboro, Mass. The new instrument is said to combine the accuracy, responsiveness and wide temperature range of electrical temperature measuring methods with the simplicity, economy and dependability of controlled valves operated by diaphragm motors. It is particularly adaptable to gas, oil, steam, hot water and hot air heating, or brine, cold water or air cooling systems. In method of measurement, electrical circuit, mechanism for detecting temperature change, construction and appearance, the new pyrometer is identical with other models featured by the company. By means of a fixed setting of the temperature dial and slide wire contact position, however, the mechanism for detecting temperature change in the new instrument acts directly in detecting galvanometer



deflection, thus transmitting in control action the full sensitivity of the measuring system. The "knife-edge" detecting device can pick up galvanometer deflection of 0.002-inch, representing sometimes as little as one-third of 1° F. Direct setting of the 12-inch scale is possible to one-fifth of 1% of scale range. Available ranges are from —300° F. to +2,800° F. The air control system in the instrument consists of a positive, open-and-shut air control mechanism. Recommended air pressure is 17 pounds per square inch. Valves are provided in both single-seated and double-seated balanced types.

Chiksan Swing Joints

DESIGNED for use in machine shops, die casting, rubber and plastic molds, and for any application that requires a small flexible joint, a new line of ⅜-inch and ½-inch ball bearing swing joints has been developed by the Chiksan Oil Tool Co., Ltd., Fullerton, California. The joints are of steel with full openings for their respective sizes. The construction of these small size joints is identical with that of the larger sizes, which range from ¾-inch to 12 inches. They

give complete 360° rotation without binding, rotating freely on double rows of ball bearings. There is nothing to tighten or to get out of adjustment, whether they are used with gas, fluid or steam. Due to their construction, the grease cannot contact with the contents of the line, and under ordinary service conditions the joints do not require any greasing after installation. Low pressure models are tested to 300 pounds, while high pressure models are tested to 4,000 pounds, with an ample safety factor allowed. The new small size swing joints are made in three styles for various rotating actions and have standard pipe thread connections. They work freely at their rated test pressure and are dependable under severe usage, according to the manufacturer.

Hot-Rite Marking Crayons

A NEW line of marking crayons, under the trade-name of Hot-Rite, has been introduced by the Eberhard Faber Pencil Co., Brooklyn, N. Y. These crayons may be used on rubber, celluloid, china, fabrics, glass, leather, plastics and porcelain, as well as on hot metal surfaces. Rubber marked before vulcanization will retain the marks after vulcanization. This feature, *i.e.*, application of the crayon to cold surfaces later subjected to heat without the marks being obliterated, applies to almost all materials. Unlike ordinary crayons, Hot-Rite will mark both cold and hot metals without melting or running off. The new crayons come in six colors—black, white, blue, red, yellow and green. They are packed one dozen to the box.

Book Reviews

The Technology of Solvents. By Dr. Otto Jordan. Translated by Alan D. Whitehead. Published in England. Distributed by Chemical Publishing Co. of N. Y., Inc., 148 Lafayette St., New York City. 6x9¾ in. 348 pp. $10.00.

Not only is this book an English translation of Dr. Jordan's "Chemische Technologie der Losungsmittel," first published in 1932, but it represents a more modern study of solvents since it incorporates a number of references to important publications on this subject, together with particulars of several new products which have appeared since publication of the German edition. In addition, it shows improvement over the original book in that comprehensive author, subject and patent indexes, absent from the German edition, are included, making this English translation more convenient as a work of ready reference.

Although various sections of the solvent industry have been treated with in the literature, no single volume covered the whole chemical technology of solvents until the publication of this book. Both the author and the translator pay special attention to modern conceptions of the character of solvents and their physical properties. These conceptions are treated with in such manner that they are understandable by the practical technician who may not be too well versed in chemical fundamentals. To this end, strictly mathematical treatment is avoided throughout the book.

The book is divided into two sections—General and Special. Twelve chapters appear in the first section, as follows: Introduction; Physical Properties of Solvents; Solvents for Cellulose Derivatives; Solvents for Resins, Rubber and Similar Binders; Use of Solvents for Extraction Purposes; Plasticizers; The System Plasticizer + Binder; Physiological Action of Solvents; Recovery of Solvents; Protective Measures; Analysis of Solvents and Lacquers; and The Manufacture of Solvents. The following three chapters appear in the Special Section: Individual Solvents; Plasticizers; Tables.

Brief reference to uses of solvents in the rubber industry is made in various sections of the book. Rubber technologists will be especially interested in references to solvents for rubber and the solubility of rubber in oxygen-containing solvents (Chapter IV), and the discussion of plasticizers for rubber and chlorinated rubber (Chapter VII).

•

Annual Bibliography of Rubber Literature for 1937. Compiled by Donald E. Cable, Ph.D. Published by THE RUBBER AGE, 250 West 57th St., New York City. 6x9 in. 128 pp. $1.00 (paper bound); $2.00 (cloth bound).

This latest bibliography of rubber literature, exclusive of patents, is the third in the series compiled by Dr. Cable, who is Technical Librarian of the General Laboratories of U. S. Rubber Products, Inc., Passaic, N. J. It continues the letter-number combination method of identifying references since it has been determined that this method best lends itself to the future preparation of a consolidated index. There are 1,281 references divided into 75 separate classifications. Extensive author and subject indexes are included. The primary object of these bibliographies is to assemble in one place a collection of appropriate references to rubber subjects, stripped of abstracts or annotations, but giving sufficient directions to permit the user to locate the original articles, or, alternatively, one or more abstracts of those articles.

•

Columbian Colloidal Carbons. Columbian Carbon Co., 41 East 42nd St., New York City. 5½x7¾ in. 194 pp.

The history, manufacture, properties and uses of colloidal carbon, more frequently referred to as carbon black, in general, and of Columbian Colloidal Carbons in particular, are given in this exceptionally interesting and well printed book. Due to its unique properties and the "magic" of its activity, this pigment has become recognized as one of the most important industrial colloids of this era. The specific purpose of the book is to contribute the results of researches conducted by the Columbian Carbon Company to industries employing, or contemplating employing, carbon black. Its use in rubber, inks, paints and other compositions is treated with in separate sections. The book includes 64 illustrations, several of them in color, and is complete to a subject index.

•

The Making and Moulding of Plastics. By L. M. T. Bell. (Revised Edition). Published in England. Distributed by Chemical Publishing Co. of N. Y., Inc., 148 Lafayette St., New York City. 5½x8¼ in. 238 pp. $5.00.

In accordance with the author's intention, indicated in the preface to this book, he has succeeded in producing "a simply written book, in which the history, the present-day essentials and the probable future developments of plastic moldings are discussed." Emphasis is given to the more important materials and processes, with little mention made of lesser-known substances unless, in the author's opinion, it seems likely that development of such substances may soon prove useful or profitable. Thoroughness, however, is not lacking. For instance, in the chapter on "Ebonite or Hard Rubber," Mr. Bell gives a brief history of rubber, discusses masticating, mixing and rolling, describes favored molding processes, including finishing and polishing, adds tables on properties, and finishes up with mention of special applications, such as in the dental field. The book has ten tables and fifty-one illustrations, and includes a short subject index.

•

How to Operate Under the Wage and Hour Law. By Alexander Feller and Jacob E. Hurwitz. Published by the Alexander Publishing Co., Inc., 60 Wall St., New York City. 6x8½ in. 248 pp. $3.50.

Written by the authors of "How to Deal with Organized Labor" (reviewed in THE RUBBER AGE, January, 1938), this book is an intelligent report on the new Wage and Hour Law based on an analysis of its provisions, especially in the light of previous similar legislation, notably the NRA. An interesting feature of the book is the presentation of solutions to many of the specific problems which the law places on employers, given in question-and-answer form. After giving the history of wage and hour legislation, the authors divide their discussion into three major classifications, *i.e.*, Scope and Extent of the Law; Administration of the Law; and Wage-Hour Law and Interstate Commerce. This book should serve an excellent purpose as a working manual to employers for use in making wage and hour adjustments with minimum trouble and expense under the law.

Booklets, Catalogs, etc.

Westinghouse General Catalog (1939-40). Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penna. 8x11 in. 1128 pp.

Application, construction and performance data on over 100,000 styles and sizes of products made by Westinghouse are included in this massive catalog, which may easily be termed a concise, up-to-date, authoritative electrical apparatus encyclopedia. There are 24 major apparatus divisions in the catalog, each of which can quickly be located by means of a heavy blue key sheet in the center of the volume. In addition to this guide, there are divisional indexes, subject index, trade-mark and name index, and a style number index. All rubber manufacturers purchasing electrical apparatus should have a copy of this catalog.

Editorial Comment

TO ITS many friends in the rubber and allied industries THE RUBBER AGE takes this opportunity of extending its sincere wishes for a Merry, Merry Christmas and Happy Days in the coming year.

THE PUBLISHERS

•

Rubber's Outlook

ALTHOUGH the decision of the International Rubber Regulation Committee last month to raise the export quota to 50% of basic shipments for the first quarter of 1939 will slow-up the decline in world stocks somewhat, it will not affect the world stock position to a point where it may endanger the current price structure. If anything, it will continue to be an influencing factor in keeping the price of crude rubber close to a 16-cent figure. From all indications, the Committee selected a quota which was mid-way between marketing and manufacturing interests, the planters calling for continuation of the 45% quota (which applied in the last six months of 1938) and the manufacturers for one of 55%.

Whereas world stocks will be reduced by approximately 50,000 tons during the final quarter of the current year, it is doubtful whether the 50% quota will allow more than a 25,000 ton reduction for the first three months of 1939. Total crude rubber shipments from all exporting countries, including non-signatories, will probably reach 72,000 tons per month in the January-March period next year, while world consumption is expected to reach approximately 80,000 tons per month, with the United States absorbing slightly more than half of that amount.

Based on consumption trends in foreign countries in recent months, it is reasonable to assume that little increase will be recorded in the first few months of 1939. The trend in the United States, however, indicates that monthly gains will be achieved in the same period. Since the new quota provides for this domestic increased consumption, there is little possibility of world stocks being reduced more sharply than the approximate 8,000 tons per month estimated. Should consumption in foreign countries take an unexpected turn upward, based on unforeseen developments, then and then only would the decision of the Committee in setting the 50% quota result in depleting world stocks too rapidly, thus affecting the price structure.

World stocks of crude rubber reached a peak of 671,000 tons in March of this year. At the end of September they were reduced to approximately 640,000. By the end of the year they will probably be in the neighborhood of 590,000 tons. If consumption estimates for the first quarter of 1939 should prove correct, they will be reduced to 565,000 tons by the end of March, 1939. A halt should be called somewhere near this latter figure to prevent run-away prices in the market.

•

Akron's Rubber Ball

HOLDING of Akron's first "Rubber Ball" on December 2 was far more than a social event of interest only to Akronites. The publicity value to the rubber industry of this Ball cannot be estimated in dollars and cents but it is bound to have future reverberations. The committee in charge of the event is to be highly complimented for the wide-spread publicity given to it by both press and radio. Products developed by Akron research and manufacture, particularly Goodyear's "Pliofilm" and Goodrich's "Koroseal", were first introduced in the guise of wearing apparel, and many of the effects were startling to say the least. As the *Akron Beacon Journal* put it, "Ziegfeld never glorified the American girl any more effectively than Akronites glorified products of the rubber tree." Any movement which directs the attention of the public to rubber and rubber products is of interest, but when submitted in such novel form it is doubly so.

CURRENT • NEWS
of the Rubber Industry

DECEMBER, 1938

50% QUOTA SET FOR 1ST QUARTER OF 1939

Meeting in London on November 15, the International Rubber Regulation Committee fixed the export quota for signatory countries at 50% of the basic maximum permissible amount for the first quarter of 1939, as compared with the 45% quota in force during the last half of the present year. Actually, however, this quota will be approximately 28% larger than in the third and fourth quarters of 1938 because of the automatic increase in the basic minimums in 1939.

The committee's action is viewed as a compromise between the position of the planters and marketing interests, many of whom favored a continuation of the 45% quota, and American manufacturing interests which were generally in favor of a 55% quota. It is pointed out, however, that while the 50% quota is satisfactory under present conditions, it may result in the sharp decline of world stocks if domestic and European consumption should improve materially in the next few months.

World Stock Situation

Latest available figures on world stocks outside of the regulated areas show a total of 530,620 tons on September 30, which compares with the peak of 565,326 tons on April 30. By the end of the current year, these stocks will probably be further reduced to between 470,000 and 490,000 tons, which will compare with 523,678 tons at the end of December, 1937, and 458,261 tons at the close of 1936.

Although the 50% quota will permit substantially larger shipments than in the third and fourth quarters of 1938, the permissible exports will still be considerably smaller than in the first quarter of 1938. In that period, the actual net exports from all producing areas were 238,385 tons. In the first quarter of 1939, permissible exports from all the regulated areas (including Siam and French Indo-China) will be 208,313 tons. Together with exports from the unregulated areas, the total is likely to run approximately 9% less than in the like 1938 period.

The improving statistical position of rubber, and the favorable consumption outlook for next year, are regarded as precluding any necessity for inventory write-downs by American rubber manufacturers at the year-end. On the other hand, there is general apprehension among manufacturers that the reduction in stocks early next year may become too pronounced and cause a shortage of rubber, with run-away market prices resulting, such as occurred in the early months of 1937, which was followed by a sharp price decline and large inventory losses.

It is generally believed, however, that a shortage next year of any consequence is highly improbable. In addition to the larger shipments allowed for the first quarter, the liberalized provisions of the new regulation agreement permitting a larger accumulation of stocks on the plantations would make possible a rapid increase in exports if an emergency existed and immediate enlargement of the quota became necessary.

Sealing Doors Against Gas

One of the latest forms of sealing doors and windows against gas, which came to light during the recent war scare in Europe, consists of wooden panelling in which thin strips of latex rubber cushioning have been embedded. The panelling, with its projecting strips of cushioning, is clamped to the door frame and floor, and the rubber is compressed to form an air-tight fitment, which is both neat and foolproof.

New York Xmas Party

The New York Group, Rubber Division, A.C.S., was scheduled to hold its annual Christmas Party at the Building Trades Club in New York City on December 16. Scheduled events included election of officers, sleight of hand tricks by H. Walter Grote, the delivery of a "mystery technical paper" by "Mr. X," and distribution of donated prizes.

Firm Name Changed

Leather Finish, Inc., Malden, Mass., has changed its name to the Malrex Chemical Company. Reason given for the change is that the former name did not truly designate the nature of the business. The company manufactures the "Rex" line of compounds, recommended for use in the stabilizing and thickening of latex among other applications.

GARVIN DREW HEADS LOS ANGELES GROUP

Garvin A. Drew (A. Schrader's Son) was elected chairman for the coming year of the Los Angeles Group, Rubber Division, A.C.S., at its regular monthly supper meeting held at the Mayfair Hotel on December 6. He succeeds Edward W. Royal (H. M. Royal Co.).

The new vice-chairman is William C. Holmes (Dill Mfg.), while William J. Haney (Kirkhill Rubber) was elected treasurer, and Monty Montgomery (Martin, Hoyt & Milne) was re-elected secretary. The new Executive Committee consists of A. D. McPherson (Goodrich), William Shawger (D. & M. Machine Works), and Roy B. Stringfield.

Approximately 140 members and guests attended the meeting, setting a new attendance record for the Group. The program was put on by the Firestone Tire & Rubber Co., with C. L. Smith, factory manager of the Los Angeles plant, presiding. Music was furnished during the dinner. Table favors, consisting of a comb and nail file, were furnished by Firestone.

Several Papers Delivered

A number of short papers were delivered by various Firestone executives. Chase Trayweek spoke on "Firestone's Finance Plan;" George Miller, chief chemist of the Xylos Rubber Co. of California, discussed "The Backyard Plantation;" John F. Moore gave a talk on high speed racing and the part played by tires. A motion picture in color was also part of the program.

The special prize of the evening, a "Toastmaster" hospitality tray complete with accessories, was won by Joseph J. Fiondella. Three other door prizes went to I. W. Robertson, F. L. MacDonald and E. P. Schriner. This was the last of the series of four programs staged successively by the four major rubber companies in Los Angeles—U. S. Rubber, Goodyear, Goodrich and Firestone. More than fifty Firestone men were present at the meeting, a number believed to have set a new record.

The retiring chairman, Ed Royal, announced that there will be no meeting in January. The next meeting will be held on the first Tuesday in February and the program will tie in with National Boy Scout Week, with the Scouts furnishing most of the program features.

URGES DEVELOPMENT OF RUBBER SOURCES

Immediate development of South America as a major source of raw rubber was strongly urged recently in a statement issued by J. M. Slattery, manager, rubber and cotton department, Fisk Rubber Corp., Chicopee Falls, Mass. "Swiftly changing and unsettled political and economic conditions in the Far East—practically the entire source of the world's present rubber supply—make it imperative that this country release itself from dependence upon factors that may in the future prove uncertain," he declared.

Mr. Slattery recommends that American industry combine to develop increased production in this hemisphere. South America, he feels, already has a huge potential supply merely requiring commercial enterprise for its development. Another reason listed for the need of such development was the fact that in case of war rubber is a major essential. Because of the tremendous investments necessary to meet production requirements, the Fisk executive does not believe that synthetic rubber will be used on a wide commercial scale in less than 20 years.

In 1926, Mr. Slattery pointed out, the United States consumed 67% of the raw rubber produced. Today we consume only 48%, not because we are using less but because other countries are using more. Our own needs are steadily increasing and development of new uses for rubber also makes it imperative that we have a steady supply.

GOODYEAR TO BUILD FACTORY IN BRAZIL

Goodyear Tire & Rubber Co., Akron, will construct a rubber manufacturing plant in Sao Paulo, Brazil. A group of factory buildings has already been purchased and technical men and plant equipment are on the way to South America. When completed, the plant will have a capacity of approximately 600 tires a day, along with a limited line of other rubber products, according to present plans.

Establishment of a plant at Sao Paulo has been contemplated by the company for many years. It will mark Goodyear's ninth plant in foreign countries and the second in South America, the other being in Argentina. The site was selected by President Paul W. Litchfield during a visit to Brazil last summer.

F. J. "Nick" Carter, personnel manager at the Kelly-Springfield plant at Cumberland, Maryland, a Goodyear subsidiary, will be superintendent of the new Sao Paulo factory. Paul Murphy, Don Lamphear and Jerry Bloom will be in charge of various manufacturing divisions. Hy Sivaslian, construction engineer, who built the Goodyear plant in the Argentine and many buildings at Akron, will be in charge of construction activities. Production at the plant will serve the Brazilian market only and will utilize raw materials from that country.

Coming Events

Dec. 26-28. American Physical Society, Annual Meeting, Washington, D. C.

Dec. 28-29. Society of Rheology, Mellon Institute, Pittsburgh, Pa.

Jan. 9-13. Annual Meeting, Society of Automotive Engineers, Detroit, Mich.

Jan. 20. Akron Group, Rubber Division, A.C.S., City Club, Akron, Ohio.

Feb. 7. Los Angeles Group, Rubber Division, A.C.S., Mayfair Hotel, Los Angeles, Calif.

April 3-7. 97th Meeting, American Chemical Society, Baltimore, Md.

May 22-June 8. World Automotive Engineering Congress, auspices S.A.E., New York, Indianapolis, Detroit and San Francisco.

June 26-30. Annual Meeting, A.S.T.M., Chalfonte-Haddon Hall, Atlantic City.

Twemo Loses Appeal

The United States Circuit Court of Appeals, at Covington, Kentucky, on November 14 upheld the ruling by Federal Judge Paul Jones of Cleveland that the vulcanizing process patents held by the Goodyear Tire & Rubber Co., Akron, did not infringe upon patents owned by the Twemo Corporation and W. L. Fairchild of New York City. After hearings before a referee two years ago, Judge Jones dismissed the plea and assessed costs against the plaintiffs. This decision was appealed on July 30, 1936, and has now been upheld by the Circuit Court of Appeals.

Bata to Build Plant

The Bata Shoe Company of Czechoslovakia, one of the largest shoe manufacturers in Europe, will definitely start construction of its long proposed shoe factory at Belcamp in Harford County, Maryland, within a year, according to Robert H. Archer, Jr., of Baltimore, American counsel for the company. Bata has already acquired approximately 2,100 acres for the contemplated plant. Mr. Archer revealed that the unsettled conditions in Europe had virtually "tied the company up."

Marketing Rubber Dust

Lefelar Products, Inc., Trowbridge Building, Clifton, N. J., has been formed to manufacture and market vulcanized rubber dust. The company purchases buffed rubber from retreaders, recappers and other sources, segregates the rubber from the lint, fabric, dirt, etc., by mechanical means, and then grades the remaining vulcanized rubber dust. In some cases, complete tire carcasses are used in the process.

AERONAUTICAL SALES WILL REACH NEW PEAK

Sale of tires, tubes and other rubber products for use on airplanes is expected to reach a record high of approximately $1,300,000, as compared with the estimated value of $1,100,000 in the previous year, according to a recent article in the *Wall Street Journal*. The Rubber Manufacturers Association recently reported that the sales value of tires and tubes alone will reach $850,000 this year as compared with $603,000 in 1936 and $278,000 in 1934.

It is estimated that more than fifty different rubber articles are now used in airplanes. Among the latest developments, in addition to the "De-Icer" and improved products for insulation against and the absorption of vibration, is the use of rubber in airplane brakes. Other uses include rubber abrasion shoes on wings to prevent denting from flying pebbles, rubber grommets, rubber paint and rubber caulking for pontoons.

Airplane tires must be constructed to withstand considerable bruising from impact of landing and to resist rapid oxidation. Rubber manufacturers have been successful in producing airplane tires which are light in weight yet resistant to bruising and cutting. Much development has also occurred in tread design. Approximately 90% of the tires used on army airplanes, however, are smooth surfaced since army specifications call for low-weight equipment. Another trend in airplane tires is toward bigger casings.

FIVE TIRE COMPANIES NAMED IN PRICE SUIT

Five leading tire companies and five major oil companies were made defendants in what is believed to be the first important action brought in the oil industry under the terms of the Robinson-Patman Law. All ten companies were named in a suit filed in the Federal Court in Birmingham, Alabama, last month by the Alabama Independent Service Station Association, Inc., and two individual service station operators. The tire firms were Goodyear, Goodrich, U. S. Rubber, Firestone and General.

The plaintiffs are seeking an injunction to restrain the tire manufacturers from giving discounts in the retail sales of gasoline. The complaint charges that the oil companies entered into an agreement with the tire companies to supply them with fuel at a price low enough to enable them to sell at from 2 to 2½ cents below their posted prices. It states that the alleged practices were indulged in "for the purpose of enabling each to obtain a monopoly in the sale of gasoline to Birmingham consumers."

In addition to an injunction, the suit also asks $100,000 for damages alleged to have been done to the plaintiffs by the cited practices. Federal Judge T. A. Murphree has already set a date for a hearing on the petition.

LECTURES ON RUBBER ARE GIVEN AT M.I.T.

Six lectures have already been given in the recently announced course in "Rubber—Its Chemistry and Application" at the Massachusetts Institute of Technology, Cambridge, Mass. The course is being sponsored by the Division of University Extension, Department of Education, Commonwealth of Massachusetts, State House, Boston, Mass.

In all, sixteen lectures were scheduled for the course, the charge being $5.00 for eight lectures or $9.00 for the complete course, which is intended to give a comprehensive picture of the rubber industry to those now engaged in its various activities and to those interested in its development. The dates of the remaining lectures, together with their subjects and lecturers, follow:

Dec. 20—*Heavy Mechanical Rubber,* J. M. Bierer (Boston Woven Hose); Jan. 3 — *Sundries — Electrical Tapes, Crepe Soles,* F. E. Harris (Plymouth Rubber); Jan. 10 — *Latex,* Dr. R. J. Noble (consultant); Jan. 17 — *Rubber Footwear,* W. E. Glancy (Hood Rubber); Jan. 24—*Rubber Insulated Wire,* A. R. Kemp (Bell Telephone Labs.); Jan. 31—*Vulcanization,* Dr. Ernst A. Hauser (M.I.T.); Feb. 7 — *Tires,* Walter J. Geldard (Fisk Rubber); Feb. 14 — *Rubber Derivatives and Synthetic Rubber,* J. C. Walton (Boston Woven Hose); Feb. 21—*Laboratory Tests and Their Limitations,* M. Omansky (A. D. Little, Inc.); Feb. 28—*Looking Forward in the Rubber Industry,* M. Omansky.

Enrollment for these lectures may be made at the office of the Division of University Extension, Room 217, State House, Boston. State certificates are being awarded to students who satisfactorily fulfill the requirements of the course.

AMERICAN SYSTEM DEFENDED BY O'NEIL

"American industry provides young men with an opportunity to rise from one economic level to higher levels almost without limit," according to a speech delivered on December 5 by William O'Neil, president of the General Tire and Rubber Co., Akron, at a joint session and banquet of the Senior and Junior Chambers of Commerce of Youngstown, Ohio, "while in Europe, particularly in England, workmen are held down, not by their superiors but by their own class." Mr. O'Neil recently returned from an extended trip abroad.

"Out of a thousand employees in any plant," said Mr. O'Neil, "probably only comparatively few can find positions as foremen or executives, but the American idea is to assure others who may be as well qualified, as far as possible, stability of employment. If the regular employees of almost any manufacturing plant would work a few extra hours a week, at peak times, more than 80% of them could be given steady work. In our plant that would be true, 100%."

Referring to the labor situation, Mr. O'Neil said: "Those persons who are not thinking of the interests of the regular employees, but only how to get more persons on the payroll and, hence, into labor organizations, like to talk about 'sharing the work and wealth.' So-called 'sharing the work' hurts the regular workman more than anyone else. It often means that his annual wage is reduced from $1800 to $2000 down to about $1200 or less a year. At that wage, he is not able to buy the things the production of which would give employment to many other persons in other lines of work."

Converse Sues Servus

Converse Rubber Co., Malden, Mass., has filed suit against the Servus Rubber Co., Rock Island, Ill., in the United States District Court for the Southern District of Illinois, Northern Division, alleging infringement of U. S. Design Patent 109,759 covering the waterproof overshoe sold by the plaintiff under the trade-name of "Sno-Pac." Converse is seeking an injunction against further alleged infringement, also asking for an accounting of profits, damages and costs.

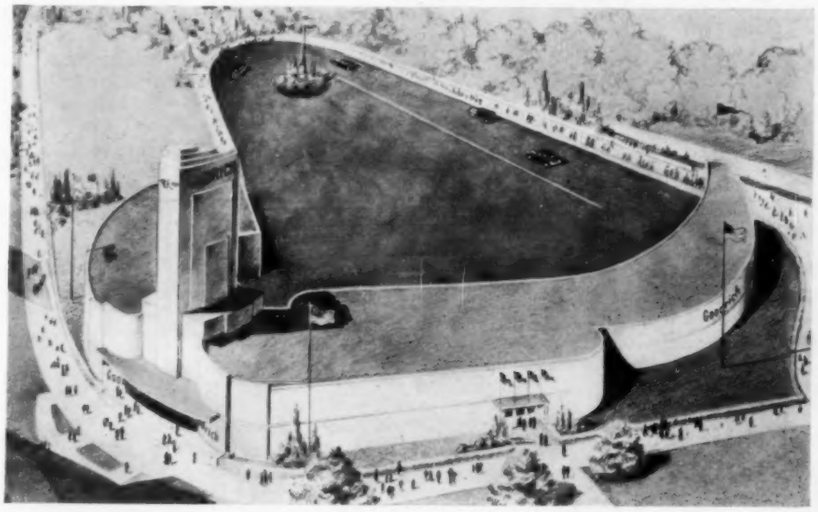
Elect Rubber Trade Officers

At a meeting of the board of directors of the Rubber Trade Association of New York, Inc., held last month, the following officers were elected for the coming year: *President,* H. Muehlstein (H. Muehlstein & Co.); *Vice-President,* A. L. Grant (Charles T. Wilson Co.); *Treasurer,* Louis V. Keeler (Avia Co.). B. G. Davy was re-appointed secretary-manager. The following directors will serve for 1939: Robert Badenhop, A. Bendixsen, Philip Billhardt, Wm. E. Bruyn, A. L. Grant, Louis V. Keeler, J. Louis, H. Muehlstein and D. A. Paterson.

Forming New Company

M. H. Martindell, associated with the Jos. Stokes Rubber Co., Trenton, N. J., for more than thirty years, the last several of which have been spent as vice-president and factory manager, is understood to have left that company and to be planning the formation of the Martindell Hard Rubber Molded Plastic Company. According to reports, Mr. Martindell will lease a plant in or near Trenton shortly and will produce various hard rubber products.

GOODRICH TO OPERATE PROVING GROUND AT FAIR



The B. F. Goodrich Co., Akron, signed a contract late last month for a plot of 120,150 square feet for its exhibition at the New York World's Fair of 1939. The major portion of this plot will consist of a proving ground on which Goodrich tires will be demonstrated daily for Fair visitors. Seating capacity for approximately 5,000 spectators will be provided, according to present plans. The proving ground, a sketch of which is reproduced above and which was designed by Wilbur Watson of Cleveland, will have certain areas covered with water while others will be studded with mechanically controlled bumps. Visitors will be permitted to ride over the course in test cars. The Goodrich exhibit will also demonstrate the operation of rubber springs on an automobile chassis as well as the efficiency of rubber marine bearings. A huge rubber wall map is planned which will trace the origin of rubber and show the source of supply of various materials which go into the construction of a tire. The main entrance of the exhibition building will be surmounted by a 90-foot tower. The tower will house a "tire guillotine," a heavily weighted knife which will be dropped from varying heights upon all types of tires to demonstrate their resistance to the blade. The contract between the company and Fair officials was signed with the pen used for many years by Dr. Benjamin Franklin Goodrich, founder of the company. It was filled with rubber ink.

FINANCIAL NEWS

$50,000,000 RAISED BY GOODYEAR TIRE

Goodyear Tire & Rubber Co., Akron, has completed arrangements to sell $40,000,000 twenty-year first mortgage and collateral trust 3½% bonds to insurance companies. In addition, the company has secured a $10,000,000 five-year bank credit at approximately 2¼%.

Concurrent with these disclosures, it was announced that Goodyear will call for redemption on December 30, 1938, the entire issue of its first mortgage and collateral trust 5% bonds due May 1, 1957, outstanding in the amount of $52,365,000. The bonds are callable at 102 and accrued interest at any time on thirty days notice. After redemption of these bonds, the new 3½% bonds plus the new bank credit will represent the only funded debt of the company.

The 5% bonds were originally issued in the amount of $60,000,000 in 1927 to refund higher coupon obligations. This amount has gradually been reduced to its present level as a result of purchases for a sinking fund. It is estimated that completion of the present refunding program will result in an annual saving in interest to Goodyear of more than $1,000,000 the first year or approximately 50 cents per share on 2,059,060 shares of common stock outstanding on June 30, 1938.

With the present refunding operation Goodyear climaxes a financing program undertaken in 1936 to improve its financial structure. Holders of more than 98% of the old $7 preferred stock accepted the offer made by the company in September, 1936, to exchange each share of this stock for one share of $5 convertible preferred stock and one-third share of common stock. The balance of these old shares have been called for redemption. In all, Goodyear effected a reduction in fixed obligations senior to the common stock between December 31, 1929, and June 30, 1938, of $37,113,669.

U. S. RUBBER CO. RESUMES DIVIDENDS

At a special meeting of the board of directors, held in New York City on November 22, the United States Rubber Company announced a dividend of 4% on the outstanding 8% non-cumulative first preferred stock, payable December 23 to stockholders of record on December 9. This is the first dividend payment to be made by the company in 11 years, the last previous dividend on this stock having been paid on February 15, 1928.

Resumption of the dividend payments marks the reaching of a milestone of U. S. Rubber's rehabilitation under the management of Mr. Francis B. Davis, who was made chairman of the board and president in January, 1929, succeeding Mr. Charles B. Seger. Prior to joining U. S. Rubber, Mr. Davis had been president of the DuPont Viscoloid Co.

Since Mr. Davis was placed at the helm of the company, U. S. Rubber has simplified its corporate structure. It now has 40 corporations as compared with 123 in 1929. Its funded debt and bank loans have been reduced from the sum of $130,000,000 to a funded debt of only $45,000,000. There are no bank loans outstanding. U. S. Rubber is now the largest owner of rubber-growing plantations in the world and is currently producing approximately 50,000 different types of rubber products.

Monsanto Chemical Co.

Third Quarter: Net income of $731,353 equivalent to 51 cents a share on 1,241,816 shares after deductions for preferred dividend requirements and minority interests in subsidiary companies, which compares with net income of $1,179,999, or $1.06 a share on 1,114,388 shares, in the corresponding period of 1937. For the first nine months of 1938, Monsanto reports earnings of $1,956,087 which compares with $3,955,259 in the corresponding period of the previous year. The company recently filed a registration statement with the Securities and Exchange Commission covering an issue of 50,000 shares of no par value $4.50 cumulative preferred stock. Proceeds of this issue will be added to the cash funds of the company.

Columbian Carbon Co.

Nine Months Ended September 30: Net income of $1,944,459, including $3,726 profit on sales of securities and after deductions for Federal income taxes, depreciation, depletion and minority interests, equivalent to $3.62 each on 537,406 shares of no-par capital stock, excluding 1,014 shares in the treasury. This compares with net income of $3,386,067, including profit of $263,408 from the sale of securities, or $6.85 a share, reported for the corresponding period of 1937. Current assets on September 30, 1938, amounted to $5,841,471, including $2,711,715 in cash and marketable securities, while current liabilities were listed at $910,990.

Raybestos-Manhattan, Inc.

Third Quarter: Net income of $245,184, equal to 39 cents a share, which compares with a net loss of $302,351 during the first six months of the current year. For the first nine months of 1938, company reports a net loss of $57,167, which compares with a net profit of $2,214,035 for the corresponding period of 1937. Current assets as of September 30, 1938, are listed at $8,729,218 against current liabilities of $973,756.

Baldwin Rubber Co.

Year Ended September 30: Net profit of $19,986, after surtax on undistributed earnings and other deductions, equivalent to 6 cents each on 316,757 shares of $1-par capital stock. Since the date of the company's fiscal year has been changed no comparison with the previous year can be made, but a profit of $401,828, or $1.26 a share, was reported for the first nine months of 1937.

United Carbon Co.

Nine Months Ended September 30: Net profit of $1,143,905, after expenses, taxes, depreciation and depletion, equal to approximately $2.87 a share on 397,885 common shares, which compares with profit of $1,917,108, or $4.82 a share, in the corresponding period of the previous year. Earnings for the period covered three dividend payments totalling $994,712.

Footwear Exports Decline

Exports of rubber footwear, heels and soles from the United States declined 18.5% during the first nine months of the current year as compared with the corresponding period of 1937, according to the Department of Commerce. Exports of all other rubber products declined 18.3%. On the other hand, imports of rubber footwear, heels and soles declined 24.1% in the same comparison, while imports of all rubber goods decreased by 50.3%.

New Russian Factories

According to reports from abroad, two new tire factories will be erected in Russia in the near future, one in Omsk with a potential output of 300,000 tires per year and the other in Voroniezh with an output of 600,000 per year. The capacity of existing tire plants in Russia is said to be 850,000 tires annually. A large sum of money has been earmarked by the government for the development of the country's rubber industry next year.

Safety Committee Meets

The Executive Committee of the Rubber Section of the National Safety Council was scheduled to hold its annual mid-winter meeting in Detroit on December 12 and 13 at the plant of U. S. Rubber Products, Inc. Plans for the ensuing year were to have been formulated. R. A. Bullock (Corduroy Rubber), general chairman of the Section, was to preside.

New Rubber Dealer

M. Barbanell, associated with the Hermann Weber Company for the past several years in its crude rubber department, has left that company and has formed the firm of M. Barbanell, Inc., 80 Broad Street, New York City, to import and deal in various grades of crude rubber.

BOSTON GROUP ELECTS KRISMANN AND LUKENS

Approximately 130 members and guests attended the final meeting of the current year of the Boston Group, Rubber Division, A.C.S., held at the Fox and Hounds Club in Boston on December 2. The scheduled election of officers for the coming year resulted in the following selections: *Chairman,* Emil H. Krismann (DuPont); *Vice-Chairman,* Dr. Alan R. Lukens (Thompson - Weinman); *Secretary - Treasurer,* James C. Walton (Boston Woven Hose). D. D. Wright (Hood Rubber) was elected a member of the Executive Committee. Dr. R. J. Noble (consulting technologist) was chairman of the Nominating Committee.

Because the total number present was approx mately 50% more than was expected, based on orders and reservations, dinner was considerably late in being served, with interminable delays between courses. This confusion, plus election of officers, resulted in the postponement of the paper, "A World Picture of the Rubber Industry," which was to be given by Dr. Ernst A. Hauser. It is expected that he will deliver this address at one of the meetings planned for 1939.

The only address of the evening was given by Raymond Kierman, news editor of the Boston Traveler, on "Newspaper Life." He briefly outlined the duties of the several editors on the average daily newspaper and explained the operation of such international news gathering agencies as the Associated Press and United Press. Mr. Kierman, who is also known as a radio commentator under the name of "Ray Keene," was well qualified to deliver this address which was heartily received by his audience.

Two door prizes were awarded at the meeting, the first, a 17-jewel Hamilton watch, going to William Wickham, of the E. & F. King Co., and the second, a "Thermos" desk set given by Godfrey L. Cabot, to Walter C. Weller of the recently organized Weller Chemical Co. The following companies contributed to the purchase of the first prize:

Burnett Co., E. I. du Pont de Nemours & Co., Wm. D. Eggleston Co., Ernest Jacoby & Co., Krebs Pigment Co., D. H. Litter Co., Monsanto Chemical Co., H. Muehlstein & Co., Naugatuck Chemical, New England Whiting Co., New Jersey Zinc Co., Pequanoc Rubber Co., Phillips Bros., Henry L. Scott Co., Stanley Chemical Co., Thompson, Weinman & Co., Titanium Pigment Co., R. T. Vanderbilt Co., and the L. G. Whittemore Co.

Forms Sales Agency

Walter C. Weller, formerly New England representative for Wishnick-Tumpeer, Inc., has organized the Weller Chemical Company, 141 Milk St., Boston, Mass. The new company will act as a sales agency for a number of manufacturers and suppliers, specializing in rubber chemicals and compounding ingredients including carbon black, sulfur, colors, fillers, etc.

KVET AND NELSON HEAD DETROIT RUBBER GROUP

E. J. KVET

W. G. NELSON

E. J. Kvet, technical superintendent of the Baldwin Rubber Co., and W. G. Nelson, of the tire department of U. S. Rubber Products, Inc., were elected chairman and vice-chairman, respectively, of the Detroit Group, Rubber Division, A.C.S., at the fall meeting of the Group held at the University Club in Detroit on October 28. J. Allen Bumpus, of Collord, Inc., was re-elected secretary-treasurer, while H. C. Anderson, of the Flintkote Co., was placed in charge of entertainment.

Approximately seventy-five members and guests attended the meeting, the entertainment feature of which was the showing of the motion picture "Rubber Reborn," previously shown at various group meetings, which traces the steps of manufacturing reclaimed rubber as practiced at the East St. Louis plant of the Mid-West Rubber Reclaiming Co.

The Detroit Group also planned to hold a Christmas Party at the University Club in Detroit on December 16. In addition to the presentation of one technical paper, several entertainment features were expected to be given. A report on this latter meeting will appear in our next issue.

Chicago Hears Bridgwater

Ernest R. Bridgwater, Manager, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington, Delaware, was the principal speaker at the fall meeting of the Chicago Group, Rubber Division, A.C.S., held in the Hotel Sherman, Chicago, on November 11. Approximately 140 members and guests attended. Before the business session, the usual excellent dinner was served in the College Inn of the hotel, with entertainment furnished by Buddy Rogers and a regular floor show. Speaking on "The Evaluation of Synthetic Rubber-Like Materials," Mr. Bridgwater emphasized the necessity of making more practical tests than is now customary. He described a number of evaluation tests currently practiced and later answered many questions from the floor. The Chicago Rubber Group was also scheduled to hold its annual combined Christmas Party and Ladies' Night at the Hotel Sherman on Friday, December 9. A report of this affair will appear in our next issue.

Akron Has Fall Meeting

Approximately 210 members and guests attended the fall meeting of the Akron Group, Rubber Division, A.C.S., held at the Akron City Club on November 11. A. E. Warner (C. P. Hall Co.), chairman of the Group, presided. Dr. William C. Geer, the principal speaker, was introduced by J. W. Schade (Goodrich). Speaking on "The Spirit of Research in the Rubber Industry," Dr. Geer traced research activities of the industry from the early days of the current century up to the present. He revealed when and how management first took cognizance of the importance of rubber research and how well it is now supported to the betterment of the public at large.

Canadian Group Meets

The Ontario Rubber Section of the Canadian Chemical Association held its first meeting of the current season on November 10 at the University of Toronto, Toronto, Canada. Approximately fifty members and guests heard Professor Joslyn Rogers of the University speak on "Chemistry Before the Courts." The lecture indicated the work of the chemist in various aspects of criminal investigation. At the business session, plans were announced for a "Short Papers" night to be held some time in February. The papers, which are to be presented voluntarily by members of the Group, will each be two to three thousand words in length. A meeting of this group was also scheduled to be held on December 7 at McMaster University, Hamilton, Ontario, with a paper on the "Evaluation of Synthetic Rubber-Like Materials" to be given by E. R. Bridgwater, Manager, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc.

New England News

Rubber footwear manufacturers throughout New England are already feeling the beneficial effect of the late November snowstorms, which skyrocketed demand for waterproof shoes in the heavily populated Northeast. A typical report was that of Arthur V. McDowell, vice-president of the Goodyear Rubber Co., Middletown, Conn., who said that factory stocks were completely exhausted and goods now being manufactured are being rushed at the request of the buyers. The real effect of the early storms will not be felt until next spring and summer, however, when depleted store stocks will result in greatly increased replacement orders.

United States Rubber Products, Inc., Naugatuck, Conn., has been recalling operators at an increased rate due to advance orders based on new season's samples. The fabric shoe departments are benefiting particularly by the increased production, especially on the new "Ked" and "Kedette" lines. More sport shoe conveyors have been started, and much improved demand for waterproof footwear is expected.

Having restored a 10 per cent wage reduction which had been in effect for six months, A. G. Spalding & Bros., Chicopee, Mass., has been calling back employees in several departments. In mid-November the total Spalding Chicopee payroll stood at about 1,000 hands. The company has discontinued all but 10 of its nearly 50 retail stores throughout the country, retaining three in New York City and individual outlets in Newark, N. J.; Hempstead, L. I.; Bridgeport, Conn.; Cambridge and Boston, Mass.; Chicago and San Francisco.

Production of lower-priced tennis rackets has been started at the new Spalding plant in Brattleboro, Vt., with a skeleton force at work. By the first of the year it is expected that the daily output of rackets at Brattleboro will reach 1,000. Rackets made there will be sold in various price classes up to $6.00.

Firestone Tire & Rubber Co., is slowly resuming production at its cotton mills in New Bedford, Mass. Men were called back in early November to prepare mill machinery for partial operation, especially looms in the tire weaving mill.

Fisk Rubber Corp., Chicopee, Mass., observed its 40th anniversary in November, with President Charles E. Speaks expressing optimism concerning the tire industry's outlook for 1939. He said he anticipated "a good year for both original and replacement tire sales". Prospects for sales of tire accessories, repair materials and bicycle tires and tubes during the next six months are exceptionally bright, according to H. W. Brown, sundry sales manager.

Armstrong Rubber Co., West Haven, Conn., has started construction of an addition to its plant in the form of an extra story on its storage building, 80 x 220 feet, of reinforced concrete, brick and steel. The work will cost $13,500.

Open New Vamos Plant

Alfred Vamos & Son, Inc., manufacturers of "Vamos" stretchable leather which incorporates "Lastex" in its construction, has opened a new plant in St. Louis to serve shoe manufacturers in the middle west. The plant has a floor space of approximately 20,000 square feet and will employ about 100 workers. The patents covering the stretchable leather process taken out by Mr. Vamos have been assigned to U. S. Rubber Products, Inc., and in return he has been appointed sole distributor to the trade of all stretchable leathers incorporating "Lastex" yarn.

Dr. Whitby to London

Dr. George Stafford Whitby, for many years Director of the Division of Chemistry of the National Research Council of Canada, and widely known in the rubber industry, has been appointed Director of the Chemical Research Laboratory of the Department of Scientific and Industrial Research of England. The Department maintains extensive laboratories at Teddington, England. Dr. Whitby succeeds Sir Gilbert Morgan who recently resigned.

Born in Hull, England, in 1887, Dr. Whitby received his early academic training at the University of London, and upon being graduated spent the next four years on the staff of Imperial College under Sir Edward Thorpe. The next seven years were devoted to an intensive study of rubber and the rubber plantations in the East Indies. He came to Canada in 1918 and joined the faculty of McGill University where he remained for eleven years before being appointed to the National Research Council.

Dr. Whitby is equally known for his ability as an author and a research worker. He has long been considered one of the foremost authorities on rubber technology and colloid chemistry. In his new position he will still be associated with rubber activities.

Los Angeles News

G. G. Balazs, who has been chief chemist at Los Angeles for the Goodyear Tire and Rubber Company for seven years, is being transferred to the company's plant in Wolverhampton, England, where he will hold a similar position. He will leave Los Angeles for Akron about January 1 and will sail from New York for England about February 1. Mr. Balazs will succeed I. D. Patterson who is being transferred to the plant at Akron. P. W. Drew who has been connected with the production department in the plant here will succeed Mr. Balazs.

During his residence in Los Angeles, Mr. Balazs took part in the activities of the Los Angeles Rubber Group, serving one year as its chairman. At the last meeting of the Group which he attended he was given the book on "Rubber" by H. and R. Wolf, autographed by 138 members. Percy Radford of the West American Rubber Company made the farewell talk on behalf of the Group.

A golf tournament planned for December 12 by the Los Angeles Rubber Group has been postponed to January 14. Three prizes have been secured and luncheon will be served. The play will be on the Flintridge Golf Course.

Work is being rushed on enlargements being made by the D. and M. Machine Works at Torrance. During the past month work was pushed on the installation of the company's own generating plant. The output of garden hose will be greatly augmented, a single order for a million feet being among the orders to be turned out in the enlarged plant.

A. S. Rocklen, manager of the Golden State Rubber Mills, announces the introduction of two new items that are meeting with good response. One is a desk guard to prevent catching hosiery and delicate fabrics on the legs of desks. The other is a typewriter key cushion.

Edward W. Royal of the H. M. Royal Company has returned to Los Angeles from a three-week trip which took him to New York, Trenton, Washington, and Chicago.

T. Kirk Hill, who has spent considerable time in recent months filming manufacturing processes in his company's plant (Kirkhill Rubber Company), has practically completed the job. He has done practically all of this work himself and at night under artificial lights.

The Commercial Rubber Co., 1601 East 24th Street, which recently installed three mills and one tuber for the manufacture of its own camelback, does not do any retreading or recapping work as intimated in this column two months ago. The company has never engaged in this line of work, but has long been manufacturing and selling repair materials to retreaders.

Names in the News

DR. IR. R. HOUWINK will become director-general of the Technico-Commercial Department of the Rubber Foundation (Rubber Stichting), Amsterdam, Holland, on January 1, 1939. He succeeds J. G. FOL, recently resigned.

H. A. HILLMAN, formerly truck and bus tire representative for the B. F. Goodrich Co., has been named retail sales supervisor for the company in the Metropolitan New York district.

MANUEL H. SAVAGE, associated with the works laboratory of the General Electric Co., at Bridgeport, Conn., for the past eight years, the last several of which were spent as assistant chief chemist, has resigned to join the Circle Wire & Cable Co., Maspeth, L. I., N. Y., as chief chemist. He was connected with U. S. Rubber at one time.

FRED W. CLIMER, manager of the labor department, Goodyear Tire & Rubber Co., Akron, has been advanced to personnel director, in which capacity he will direct personnel work in the sales field as well as in the Akron factory and offices. R. S. POPE, who has been assistant to MR. CLIMER in factory personnel work, succeeds him as manager of that department. C. E. CANNON retains his position as manager of sales personnel.

C. K. SMALTZ, traffic manager, Mansfield Tire & Rubber Co., Mansfield, Ohio, was program chairman of a dinner-dance given by the Central Ohio Traffic Club at the Mansfield-Leland Hotel, in Mansfield, on December 1.

RANDALL L. DICKERSON, formerly with the Anaconda Wire & Cable Co., and prior to that associated with the General Insulated Wire Co., is now chief chemical engineer for the Lowell Insulated Wire Co., Lowell, Mass.

GLENN SHRIBER, staff superintendent, engineering division, B. F. Goodrich Co., Akron, addressed the Engineering Society of Kent State University in the University's engineering building on December 7.

WILLIAM B. PENNEBAKER, associated with the tire advertising department of U. S. Rubber Products, Inc., for the past several years, and prior to that time for six years with the Campbell-Ewald Company of New York, an advertising agency, has rejoined the agency as head of its sales promotion department.

W. D. HINES, director of public relations, Firestone Tire & Rubber Co., Akron, addressed the Ravenna Kiwanis Club in Ravenna on November 15. He discussed rubber cultivation and the price situation.

LEWIS B. SWIFT, who has served for many years as Vice-President in Charge of Engineering and Research for the Taylor Instrument Companies, has been named president of that concern succeeding HERBERT J. WINN who becomes chairman of the board of directors. KARL H. HUBBARD has been appointed chief engineer in charge of engineering research and design.

A. E. PATTERSON, assistant manager, export division, Goodyear Tire & Rubber Co., Akron, received his twenty-five year service pin last month. Before joining Goodyear in 1913 as a salesman, he had spent five years with Firestone.

GEORGE J. BURGER, JR., in the employ of one of the leading public utility corporations for the past two years, has been hired by the National Association of Independent Tire Dealers, Inc., New York City, to actively handle the Retreading and Recapping Department under the supervision of Vice-President M. U. MOSELEY.

HENRY F. SCHIPPEL, tire design engineer, B. F. Goodrich Co., Akron, addressed a meeting of the Institute of Aeronautical Sciences in Chicago on November 19. He discussed the increasing use of rubber in aviation.

CHESTER H. GIBBONS, formerly stationed at the plant of the Baldwin-Southwark Corporation, Eddystone, Penna., has been transferred to the Ohio District in charge of sales for the Southwark Division. He succeeds A. Q. DAVIS who was recently appointed shop superintendent of the company.

M. C. MEYER, formerly representative in the Toledo district for the Republic Rubber Division of Lee Rubber & Tire Corp., Youngstown, Ohio, has been named to the newly created post of assistant to the sales manager of the company.

W. H. FUNSTON, president, Firestone Tire & Rubber Co. of Canada, Ltd., was recently elected to the board of directors of the Canadian Chamber of Commerce. He is also president of the Hamilton (Ontario) Chamber of Commerce.

MIAH MARCUS, treasurer of the Puritan Rubber Co., Trenton, has been elected president of that company to succeed the late FRANK BERENSTEIN.

C. A. DAMEN, associated with the New York office of Wishnick-Tumpeer, Inc., since its establishment, has been named manager of the company's Boston branch with headquarters at 141 Milk Street in Boston.

Williams Joins Huber

Ira Williams, associated with the Jackson Laboratory of E. I. du Pont de Nemours & Co., since 1929, and for many years head of the rubber division of that laboratory, resigned his position on December 1 to join J. M. Huber, Inc., as director of research. He will

IRA WILLIAMS

maintain headquarters at the company's laboratories in Borger, Texas.

Mr. Williams was born in Wilson, Kansas, in March, 1894. He attended Kansas University and Sterling College, receiving his A. B. from the latter in 1916. He later did graduate work at the Universities of Chicago, Pittsburgh and Akron, securing his M. S. in 1920 from the Akron institution. During the World War he served in the Gas Regiment.

In 1920 Mr. Williams joined the research department at Firestone and in 1924 went to the Mellon Institute of Industrial Research for a study of rubber chemicals on a Grasselli Fellowship. After the completion of this study, he joined the Cleveland office of the Grasselli Chemical Co. When Grasselli was acquired by du Pont in 1929, he was transferred to the Jackson Laboratory.

Mr. Williams has long been an active member of the Rubber Division, A.C.S., acting as chairman at one time, and has contributed many technical papers on rubber subjects to the literature. Last year, he was awarded the honorary degree of doctor of science by the University of Akron. The accompanying photograph of Mr. Williams is one taken several years ago.

Wooster Expanding Plant

Work has already started on the construction of a $20,000 addition to the plant of the Wooster Rubber Company in Wooster, Ohio. The addition will measure 50 x 80 feet, will be a two-story structure, and will increase the working force of the plant by 30%, according to J. R. Caldwell, president.

Obituaries

James Deshler

James Deshler, vice-president of the New Brunswick Savings Institution and a director of the United States Rubber Company with which he was affiliated for more than fifty years, died at the age of 89 in the St. Peter's General Hospital in New Brunswick on December 3 after a three-day illness. Despite his advanced age, Mr. Deshler, who was long known as the "grand old man" of New Brunswick, continued his activities until stricken.

Born in New Brunswick in May, 1849, Mr. Deshler was educated in the local public schools and upon being graduated went to Petroleum Center, Penna., where he started work as a telegraph operator in 1865. Later he became a railroad ticket agent, and still later joined a banking concern in Petroleum Center. In 1874, he returned to New Brunswick and entered the employ of the New Jersey Rubber Co. He continued with this company after it was merged into the United States Rubber Company, and was made general manager of the plant in 1888.

Mr. Deshler was the first president of the New Brunswick Trust Co., serving for ten years. He was a member of Union Lodge 19, F. and A.M., and the Sons of the Revolution. Funeral services were held on December 4, with interment in Elmwood Cemetery, New Brunswick. He leaves three daughters and a son.

John H. Bennett

John Hudson Bennett, vice-president of the Wellington Sears Co., New York City, died on November 21 at his home, 9 Washington Square North, New York City, at the age of 65, after a two-year illness. Born in Medford, Mass., Mr. Bennett was graduated from Harvard in 1894, and traveled extensively before joining Wellington Sears in 1901. He was made a partner of the company in 1907 and a vice-president in 1931. He also served as a director of several textile mills. Mr. Bennett was widely known as a collector of rare stringed instruments and included several valuable violins in his collection at the time of his death. He was also an amateur ornithologist. Funeral services were held on November 23. He leaves a widow.

Thomas O. Callender

Sir Thomas Octavius Callender, founder of Callender's Cable and Construction Company, and long known as the "Cable King" of England, died on December 2 at the age of 83 in Bidborough Court, Kent, England. One of Great Britain's leading industrialists, Sir Thomas had been a member of the Callender Cable company for more than fifty years, and was also a director in a large number of other utilities. He strung the wires for London's first electric street lights and also laid cables to light the Law Courts, first important building in England to be lighted by electricity. Among his unusual contracts was the lighting of the famous Taj Mahal in India. Sir Thomas, who was knighted in 1918, was a frequent visitor to the United States. He leaves one son.

Norman E. Oliver

Norman E. Oliver, vice-president of Philip Morris & Co., Ltd., president of the Hermetite Corporation, and a former executive of the B. F. Goodrich Co., died of a heart attack on November 16 at his home, 1016 Fifth Avenue, New York City. He was 59 years of age. Born in Detroit, Mr. Oliver joined Goodrich in 1897, was transferred to the Diamond Rubber Co. in 1900, became branch manager for both Goodrich and Diamond in New York around 1909, and held that post until his resignation in 1922. In 1921, he founded the Hermetite Corporation, manufacturers of waterproofing lacquers for silk and other cloths, leather and paper, in Trenton, N. J. Later it moved to Nutley, N. J. In 1926, Mr. Oliver joined the cigarette firm of Philip Morris as vice-president and continued in that post until his death. At one time in his career, he served as vice-president of the Quaker City Rubber Co., Philadelphia. He leaves a widow and a daughter.

Luther Martin, IV

Luther Martin, IV, sales representative for C. K. Williams & Co., Easton, Penna., died in an airplane crash near Downers Grove, Illinois, on November 15. Piloting his own plane, Mr. Martin had circled low over western suburbs for fifteen minutes trying to find his way to the Chicago Airport. It is believed his fuel supply was running low. He was 34 years of age. Mr. Martin was born in Washington Valley, N. J. His great great grandfather was one of the pioneers in the lampblack industry of the United States. He had been associated with the Williams concern for four and a half years before his death, devoting his attention exclusively to the sale of lampblack to the paint and other industries. Flying and riding were his principal hobbies. He is survived by his wife, two children, and his father.

Named State Director

S. B. Robertson, president, B. F. Goodrich Co., Akron, was named a state director of the National Association of Manufacturers at a meeting of the Association held in New York earlier this month. Several other prominent Akronites are also state directors of the Association.

General "YRT" Tire

A "year-round-tread" tire, called the "YRT" model, has been introduced by the General Tire & Rubber Co., Akron, Ohio. When sold, each tire is covered with hundreds of deep, sharp rubber winter-traction lugs which grip into slush and snow, thus providing safe

driving through the slippery winter months. In the spring, when slush and snow disappear, the same tire may be sent to any General dealer and the buttons or lugs of rubber buffed off, leaving a new silent safety tread tire that has never been on the ground. The new tread is not intended for use throughout the year in sections where positive traction is a constant essential. The accompanying illustration shows one of the new General "YRT" tires in "before-and-after" fashion.

Changes at Stokes

William J. B. Stokes, II, formerly secretary of the Jos. Stokes Rubber Co., Trenton, N. J., has been elected president to succeed his father, the late Robert J. Stokes. Charles L. Fulkert, formerly superintendent, is the new vice-president; Bertram Stromberg, associated with the Price-Waterhouse Co., has been named secretary; and Joseph Bauer, formerly with the Thermoid Co., general manager.

Cooperative Heel Campaign

The Rubber Heel Division of the Rubber Manufacturers Association has launched a cooperative advertising campaign in several boot and shoe journals designed to convince shoe manufacturers to equip all of their products with rubber heels. The first advertisement in the series gives the results of various investigations conducted to determine which heels are preferred—rubber or leather—in various walks of life.

Wins Legal Decision

A perpetual injunction order was granted to Kay Kamen, Ltd., against the Lea Bridge Rubber Works (of England) by the English High Court recently, prohibiting the company from infringing the "Snow White and the Seven Dwarfs" copyright.

GOODYEAR SETTLES OVERMAN LITIGATION

Following a hearing held in New York City on November 29 to allow creditors and stockholders to show cause why the proposition should not be accepted, the United States District Court of the Southern District of New York approved the offer made by the Goodyear Tire & Rubber Co., Akron, to pay the sum of $50,000 to the trustee of the Overman Cushion Tire Co., Inc., in full and complete settlement of the litigation now pending in the United States District Court in Cleveland between Overman as plaintiff and Goodyear as defendant.

The offer and its acceptance finally settles long drawn out litigation between the two companies. Overman originally brought suit against Goodyear alleging that the latter had violated patent rights on a truck tire which contained a hole through the center but was not inflated. Overman contended that it had licensed Kelly-Springfield (now a Goodyear subsidiary) to manufacture these tires but that Goodyear had no license to produce them.

Acceptance of the offer and the proceeds of the settlement were subject to and without prejudice to the rights of any lienors or claimants with leave given to these lienors or claimants to assert priority or special rights in and to the proceeds. The rights of all claimants and lienors were to be determined in rank and amount by the court. Overman is currently in the midst of reorganization proceedings under Section 77B of the Bankruptcy Act.

Organize Research Department

Coincident with the demonstration of a new process of ultra-speed photography, which makes possible photography at a greater degree of speed than ever before, to 1/100,000 second of exposure, held at the New York offices of A. G. Spalding & Bros., Charles F. Robbins, president of the company, announced the establishment of a research department as a separate division of the firm. The new department, which will incorporate Spalding's testing laboratory at Chicopee, Mass., will be under the direction of Dr. J. B. Dickson, associated with the company for the past fifteen years. Consultants include George S. Radford, consulting engineer, and Arthur D. Little, Inc.

Bibb Mailing Piece

An interesting sales promotional piece was sent to the trade last month in the form of a large 4-page folder by the Bibb Manufacturing Co., Macon, Georgia. Entitled "An Amazing New Development in Tire Cord," the folder gave data on the results of recent tests with tires equipped with both ordinary and rayon cord and the "Heat Resistant Cord" featured by the company. A recent advertisement from the *Saturday Evening Post* was also reproduced.

Old Hot-Water Bottle

The "grandfather" of all Akron hot-water bottles, made in 1857, has been presented to the Goodyear Tire & Rubber Museum by its owner, Mrs. Francis H. Holton. The bottle was made by Mrs. Holton's late husband who, as a boy of 13, worked in one of the pioneer rubber shoe stores in Akron. Ten years later he met Charles Goodyear and decided to make the rubber manufacturing industry his career. In 1863, Dr. B. F. Goodrich invited him to take over the rubber sundry division of the newly-established Goodrich Company. The hot-water bottle is still pliable and water-tight after all these years and has been in almost constant use.

Reclaimed Rubber in Germany

Practically every rubber article manufactured in Germany today contains a certain quantity of reclaimed rubber, according to a report from the American Consulate General stationed in Frankfort-on-Main. The Supervising Office for Rubber and Asbestos is said to be putting forth every effort to achieve the complete and most serviceable utilization of all scrap rubber throughout Germany. Operations were begun early in 1938 in a plant at Hamburg, and it is reported that by a complicated manufacturing process fairly satisfactory reclaim is secured. Articles being reclaimed at present consist mainly of tires and tubes.

Rubber Imports Dropped

The value of crude rubber, including latex, imported in the first six months of 1938 amounted to $68,935,000, a drop of 40.6% from the $115,971,000 imported in the corresponding period of the previous year. In the 1937 period, crude rubber was listed as first in the list of 50 chief imports, according to value, compiled by the Foreign Commerce Department of the Chamber of Commerce of the United States, but dropped to third place in the 1938 period, preceded by cane sugar and coffee.

Organize Paramount Co.

H. Tom Collord, president of Collord, Inc., Detroit, Mich., announces that in the future that company will produce rubber-covered automobile specialties only, and that the Paramount Rubber Service, Inc., 1430 Rosedale Court, Detroit, has been formed to take over all other departments operated by the company, including the dipping department and the manufacture of "Surfaseal" rubber paints.

BIERMACHER SETS UP CONSULTING SERVICE

Ralph Biermacher, associated with the rubber industry for more than twenty years, has resigned from U. S. Rubber Products, Inc., and has established himself as a consulting engineer for rubber and textile companies in New England and vicinity. For the past few years,

RALPH BIERMACHER

he was associated with the Chatham Manufacturing Co., recently absorbed by U. S. Rubber.

Mr. Biermacher was born in 1900 at Kingston, N. Y. He first entered the rubber industry in 1917 in the physical testing division of the laboratory of the U. S. Tire Co. in Hartford. His father was an instructor in the tire building department in the same plant at the time. He remained at this plant until August, 1929, when it was closed and the equipment removed to Detroit. Shortly thereafter, Mr. Biermacher joined the Omo Manufacturing Company, then makers of dress shields, hospital sheeting, blankets and rubber novelties, as assistant superintendent, later being advanced to general plant superintendent.

Several years later Mr. Biermacher resigned from Omo to join Chatham where he was technical director of the manufacture of cut thread and its application to weaving as practiced by the company's parent concerns, *i.e.*, Russell Manufacturing, American Mills and the Ansonia O. and C. companies. While with Chatham, he was instrumental in carrying out the patented method of making thermoplastic rubber thread.

Mr. Biermacher will maintain a laboratory at his home, 209 Main St., Cromwell, Conn. He can also be reached at Room 502, 171 Madison Ave., New York City.

The 1939 Edition of the RUBBER RED BOOK will appear in April, 1939.

New Rubber Goods

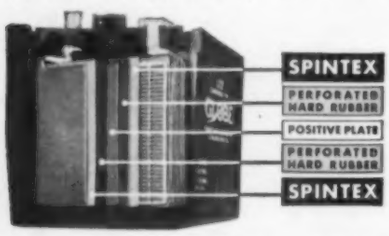
Goodyear Newsprint Plug

A rubber-covered newsprint plug, designed to facilitate the handling of large rolls of paper when loading and unloading from barges, trucks, ships, cars,

or in newspaper plants, has been introduced by the Goodyear Tire & Rubber Co., Akron. It is comprised of a steel core with a protective covering of thick rubber, an eye-bolt being supplied on one end for attaching the hoist chain. The plug, which is 10 inches long and 2-13/16ths inches in diameter, may be easily inserted into each end of a roll of paper without danger of damaging the inner layers of paper, and will not slip out when tension is applied to the hoist chains.

Dual-Insulated Batteries

The line of passenger car and heavy duty batteries featured by Globe-Union, Inc., Milwaukee, Wisc., has been augmented with a new type of dual-insulated battery designed for commercial service. In this type of service batteries are subjected to an exceptional amount of vibration which calls for a battery with an insulation that will effectively hold the active plate materials in place and yet permit fast circulation of acid to speed up recovery of starting energy. According to Globe-Union, in the new dual-insulation method, the thin, perforated, hard rubber



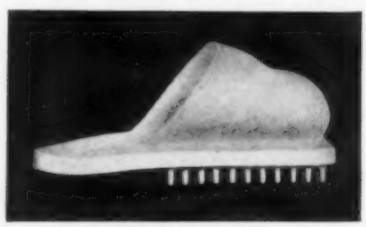
sheets on both sides of the positive plates hold the oxides firmly, while the special all-rubber ribbed sheets (known as "Spintex") permit the acid to rise and circulate rapidly between the ribbed partitions and around and over the positive plates. The accompanying illustration is a cross-section view of a typical insulated plate assembly.

Rubber Sideline Marker

Designed to minimize football injuries received when players come into contact with sideline markers when forced or thrown out of bounds, a rubber sideline marker has been developed by Mr. Mitchell Menachof, Brookville, Indiana. The new marker is made of sheet rubber over a spring frame which gives in any direction when contact with it is made. A large spring on the bottom is specially wound so that it also gives under pressure. Two sizes are available, one for stadiums with seating capacity under 20,000, and the other for larger stadiums. The numbers on the larger marker are over 36 inches in height. According to the inventor, the spring frame of the marker is well protected against any type injury possible, while the cost of the complete marker is approximately one-third that of ordinary wood and steel types.

Finger-Dent Toothbrush

A finger tooth brush, made of latex, called Finger-Dent, which also acts as a safe and efficient gum massage brush, has been introduced by Finger-Dent, Inc., Montgomery, Penna. According to



the manufacturer, the latex bristles will not injure the sensitive gum tissue of even a child's mouth, yet they provide the stimulation necessary for firm healthy gums. The action of this new tooth brush is also said to be new in that the bristles erase tooth film instead of scratching it off. Finger-Dent, which can be sterilized in boiling water or alcohol, comes in several colors, each packed in a metal capped glass tube.

Avioflex Hose Line

A new type of fuel and oil line utilizing a flexible metal core protected by cellophane and neoprene has been developed by the Chicago Metal Hose Corp., Maywood, Ill. The new hose line not only withstands deterioration caused by oils, vibration and strains, but at the same time is light in weight. While perfected primarily for use in aircraft, it is now being introduced into industrial applications. The cellulose sheeting, laminated, provides a seal over the entire inner tube, while the neoprene cover binds the unit together, thus providing double protection. Metal braid forms the outer shell.

Corduroy "Superib" Tire

The "Superib" tire is the latest addition to the line manufactured by the Corduroy Rubber Co., Grand Rapids, Mich. The new tire is constructed with

a cool-running cord that resists heat, with each cord fiber sealed in a coating of live rubber, the result being a casing which is said to be 25% stronger than that built of ordinary cord materials. It is designed with large sturdy ribs plus smaller flexible ribs, thus making for "squeegee" action and providing extra traction. A special feature is a small flexible rib which acts as a stone ejector. In appearance, the "Superib" is streamlined and is said to give an extra degree of smartness to the most expensive of cars.

Rubber Sandpaper Holder

A sandpaper holder made of semi-hard inner tube stock is being manufactured by A. A. Campbell, Huron, Ohio. It is a novel form of rubber block having slots in each side for quick insertion and for retention of abrasive materials. The holder is so

designed that the operator's hand does not rest on the paper or come in contact with the surface being sanded. The low yield point of semi-hard rubber not only is an aid to close, even application of the sanding material, but the resiliency of the rubber forces the sandpaper into every part of the surface. Sanding in corners or other tight spots is said to be a simple operation with the new Campbell Hand Sander.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, DECEMBER 10, 1938

Crude Rubber

GENERAL weakness in the sterling exchange and poor reports from the London market resulted in trade and commission house selling in mid-November with the result that the price started a steady decline. Announcement of a 50% quota for the first quarter of 1939 by the International Rubber Regulation Committee on November 15 broke the price on the Exchange to 16.59. Continued weakness of the London market and general liquidation in crude rubber futures brought the price down to 15.45 on November 28, but renewed factory buying in the last few days of the month brought it back to a 16-cent figure. In the past ten days the price has moved upward slowly as a result of consistent buying, much of it attributed to Japanese sources. Few shipment offerings are being made from the Far East, and most of these are proving too high for immediate action. Since our last report, the price has swung in a 163 point range, high being 17.08 on November 10 and low 15.45 on November 28. Quotations in the outside market, Exchange, London and Singapore, follow:

As of December 10

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.16
January-March	—	@	.16 1/16
April-June	—	@	.16 1/16
No. 2	—	@	.16 1/16
No. 3	—	@	.16 1/16
No. 4	—	@	.16 1/16
Thin Latex Crepe	—	@	.17 1/16
Thick Latex Crepe	—	@	.18 1/16
Brown Crepe, No. 1	—	@	.15 1/2
Brown Crepe, No 2	—	@	.15 1/16
Amber Crepe, No. 2	—	@	.15 1/2
Amber Crepe, No. 3	—	@	.15 1/16
Brown Crepe, Rolled	—	@	.14 1/16

Latex—

Normal, per lb., carload lots	—	@	.19 1/16

Paras—

Up-River, fine	—	@	.14 5/8
Acre Bolivian, fine	—	@	.14 3/4

Balata—

Surinam sheet	—	@	.38

LONDON MARKET

Standard Smoked Sheets—Buyers—December 10

January-March	8 1/16	@	8 1/8d
April-June	8 1/8	@	8 3/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—December 10

January-March	—	@	7 11/16d
April-June	—	@	7 13/16d

Reclaimed Rubber

Reclaimers continue to maintain an optimistic attitude for 1939 with present business reported fair. Consumption of reclaimed rubber for October was estimated at 11,803 tons by the Rubber Manufacturers Association, a gain of 522 tons, or 4.6%, over consumption in the previous month. There has been practically no change in the price structure. Current quotations follow:

Shoe

Unwashed	lb.	.06 1/2	@	.06 3/4
Washed	lb.	.10	@	.10 1/4

Tube

No. 1 (Floating)	lb.	.12	@	.12 1/4
No. 2 (Compounded)	lb.	.08	@	.08 3/4
Red tube	lb.	.08	@	.08 3/4

Tires

Black (acid process)	lb.	.07	@	.07 1/4
Black, selected tires	lb.	.06	@	.06 1/4
Dark Gray	lb.	.09 1/4	@	.09 3/4
White	lb.	.11 1/2	@	.12
Truck, Heavy Gravity	lb.	.05 1/2	@	.06
Truck, Light Gravity	lb.	.07	@	.07 1/2

Miscellaneous

Mechanical blends	lb.	.04 1/2	@	.05

Scrap Rubber

(Delivered Akron Mills)

Scrap rubber dealers report a fair amount of trading in the past month, with stocks becoming a little scarce as is usual during the winter months. Prices have increased on several grades of scrap since our last report, including auto tire peelings, mixed auto and untrimmed arctics. Current prices follow:

(Prices to Consumers)

Auto tire peelings	ton	16.00	@	18.00
Mixed auto	ton	11.00	@	12.50
Beadless tires	ton	14.50	@	16.00
Clean solid truck tires	ton	20.00	@	22.50
Boots and shoes	ton	18.00	@	20.00
Arctics, untrimmed	ton	13.00	@	15.00
Inner tubes, No. 1	lb.	.07	@	.08
Inner tubes, No. 2	lb.	.03 3/4	@	.03 3/4
Inner tubes, Red	lb.	.03 3/4	@	.03 3/4

Cotton

After climbing to 9.36 on November 14, the price for middling uplands on the Exchange started a downward movement with temporary halts. Slow liquidation of the December interest, the increasingly unfavorable statistical position, poor exports, the tendency of foreign users away from American growths, and the slow movement of finished textile products were among the factors contributing to the decline. The estimate of the Crop Reporting Board, announced on December 8, which set a figure of 12,008,000 bales, or 129,000 below the figure reported a month ago, served to send the price down to still lower channels. This estimate was 62,000 bales under the average trade guess and 23,000 below private estimates. The price advanced from 8.57 yesterday to 8.68 today (December 10) while the trade awaited the vote of the referendum on continued crop control. There is little doubt, however, that control will again be approved. Quotations for middling uplands on the Exchange follow:

	Nov. 9 Close	December 10 High	December 10 Low	December 10 Close
December	8.51	8.44	8.30	8.38
March	8.44	8.30	8.14	8.23
July	8.10	7.85	7.68	7.76

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.27	@	.27 1/4
Peeler, carded, 23/4/3	lb.	.28	@	.28 1/4
Peeler, carded, 15/3/3	lb.	.25	@	.25 1/4
Peeler, carded, 13/3/3	lb.	.24	@	.24 1/4
Egyptian, carded, 23/5/3	lb.	.40	@	.40 1/4
Egyptian, combed, 23/5/3	lb.	.45	@	.45 1/4

CHAFERS

Carded, American, 1 1/4"	lb.	.27	@	.27 1/2
Carded, American, 1"	lb.	.18	@	.23

Sheetings

48x40	36 in.	5.50	lb.	—	@ .03 1/2
40x40	36 in.	6.15	lb.	—	@ .03 5/8
40x36	36 in.	6.50	lb.	—	@ .03
48x48	40 in.	2.50	lb.	—	@ .07
48x48	40 in.	2.85	lb.	—	@ .06
56x60	40 in.	3.60	lb.	—	@ .05 1/4
48x44	40 in.	3.75	lb.	—	@ .05
44x40	40 in.	4.25	lb	—	@ .04 1/2

Ducks

Enameling (single filling)	lb.	.21	@	.23
Belting and Hose	lb.	.25	@	—
Single filling, A grade	lb.	.09 1/2	@	.12 1/2
Double filling	lb.	.10 1/2	@	.13 1/2

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM NOVEMBER 10 TO DECEMBER 10

Date	Spot	Nov.	Dec.	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Sales
Nov. 10	17.08	17.10	17.10	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.01	17.03	17.04	——	371
11															
12	17.00	16.99	16.99	16.97	16.95	16.94	16.94	16.95	16.93	16.93	16.94	16.95	16.96	——	85
13															
14	16.75	16.72	16.72	16.73	16.73	16.74	16.74	16.77	16.77	16.78	16.76	16.77	16.77	——	354
15	16.59	16.57	16.57	16.57	16.57	16.57	16.59	16.62	16.63	16.64	16.63	16.62	16.62	——	403
16	16.30	16.20	16.33	16.35	16.35	16.32	16.34	16.35	16.35	16.33	16.36	16.38	16.39	——	414
17	16.15	16.12	16.12	16.05	16.08	16.07	16.09	16.11	16.12	16.13	16.13	16.14	16.14	——	442
18	15.93	15.92	15.92	15.93	15.93	15.94	15.96	15.98	15.99	16.01	16.02	16.03	16.04	——	396
19	16.06	15.98	16.05	16.00	16.03	16.04	16.04	16.04	16.04	16.06	16.08	16.10	16.11	——	70
20															
21	15.68	15.64	15.65	15.65	15.65	15.65	15.65	15.65	15.65	15.65	15.65	15.65	15.67	——	416
22	15.98	16.00	15.98	15.97	15.97	15.96	15.97	15.97	15.97	15.96	15.96	15.99	15.99	——	391
23	15.90	15.95	15.90	15.85	15.91	15.90	15.91	15.90	15.90	15.90	15.90	15.91	15.92	——	365
24															
25	15.90	15.94	15.90	15.90	15.90	15.90	15.91	15.94	15.94	15.95	15.95	15.97	15.99	——	289
26	15.55	15.65	15.52	15.60	15.59	15.58	15.63	15.65	15.65	15.65	15.70	15.74	15.72	——	115
27															
28	15.45	——	15.48	15.50	15.51	15.53	15.53	15.55	15.59	15.61	15.61	15.63	15.64	——	420
29	15.75	——	15.77	15.75	15.75	15.75	15.77	15.77	15.80	15.80	15.82	15.84	15.86	——	273
30	16.05	——	16.07	16.05	16.05	16.06	16.06	16.06	16.07	16.08	16.08	16.09	16.12	——	270
Dec. 1	16.05	——	16.05	16.05	16.05	16.03	16.05	16.07	16.07	16.08	16.08	16.10	16.14	16.15	77
2	15.90	——	15.89	15.90	15.90	15.91	15.91	15.91	15.91	15.91	15.93	15.96	15.97	15.98	121
3	15.87	——	15.85	15.86	15.86	15.86	15.86	15.86	15.86	15.87	15.88	15.90	15.91	15.91	39
4															
5	15.80	——	15.80	15.76	15.78	15.80	15.80	15.81	15.81	15.81	15.82	15.84	15.85	15.85	156
6	15.95	——	15.97	15.96	15.96	15.96	15.97	15.98	15.98	15.99	15.99	15.99	15.99	15.99	162
7	16.25	——	16.22	16.15	16.14	16.13	16.13	16.12	16.14	16.16	16.18	16.20	16.21	16.21	309
8	16.05	——	16.05	15.98	15.97	15.95	15.97	15.98	15.98	15.99	15.99	16.00	16.02	16.02	287
9	16.07	——	16.09	16.02	16.02	16.02	16.02	16.03	16.03	16.04	16.04	16.05	16.06	16.06	228
10	16.11	——	16.12	16.07	16.07	16.07	16.07	16.08	16.08	16.10	16.09	16.09	16.09	16.09	37

Fragile!

Micronex Beads are fragile but not too fragile. The particles temporarily welded into a pellet are readily restored to their original fineness.

A MICRONEX BEAD breaks down immediately and completely under the shearing stresses imposed in the course of rubber mixing. Certain crushing action also is involved.

Here are shown fragments of a single crushed pellet enlarged sixty diameters. These hundreds of fragments are the product of a Micronex Bead which had a diameter of approximately .026".

BINNEY & SMITH CO.
DISTRIBUTORS
41 East 42nd St., New York, N. Y.

•

COLUMBIAN CARBON CO.
MANUFACTURERS

MICRONEX

THE *Premier* CARBON BLACK FOR RUBBER USE

Beads or Compressed

New York
December 12, 1938

Rubber CHEMICAL Markets

All Quotations F.O.B. Works Unless Noted

ACCELERATORS

Organic				
A-1 (Thiocarbanilid)	lb.	.26	@	—
A-5-10	lb.	.35	@	.40
A-11	lb.	.52	@	.65
A-19	lb.	.52	@	.65
A-32	lb.	.70	@	.80
A-77	lb.	.42	@	.55
A-100	lb.	.42	@	.55
A-433	lb.	.45	@	.55
Aldehyde ammonia, crystals	lb.	.65	@	.70
Altax	lb.	.55	@	.70
Butyl Zimate	lb.	3.00	@	—
Captax	lb.	.50	@	.60
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.44	@	.46
Diphenylguanidine	lb.	.35	@	.36
El-Sixty	lb.	.57	@	—
Ethyl Zimate	lb.	3.00	@	—
Ethylidene aniline	lb.	.42	@	.43
Formaldehyde aniline	lb.	.37½	@	.42
Guantal	lb.	.45	@	—
Heptene	lb.	.35	@	.40
Hexamethylenetetramine	lb.	.36	@	—
Lead Oleate, No. 999	lb.	.14	@	—
Witco		.15	@	—
Litharge	lb.	.18	@	.20
Methylenedianiline	lb.	.36	@	.37
Monex	lb.	3.25	@	—
Oxynone	lb.	.64	@	.80
Phenex	lb.	.50	@	.55
Pip-Pip	lb.	2.50	@	—
Pipsolene	lb.	1.55	@	1.85
R & H 40	lb.	.40	@	.41
R & H 50-D	lb.	.42	@	.43
R-2	lb.	1.40	@	1.80
R-23	lb.	.40	@	—
Rotax	lb.	.60	@	.65
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.	.50	@	—
No. 2	lb.	.18	@	.20
Thiocarbanilid, drums	lb.	.24	@	—
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.60	@	—
Tuads	lb.	2.65	@	—
Ureka	lb.	.60	@	.75
Ureka Blend B	lb.	.60	@	.75
Ureka C	lb.	.56	@	.65
Vulcanex	lb.	.42	@	.43
Vulcone	lb.			
Vulcanol	lb.	.85	@	—
Z-88-P	lb.	.51	@	—
Zimate	lb.	2.65	@	—
Inorganic				
Litharge, domestic	lb.	.07	@	.07½
Magnesia, calcined, heavy	lb.	.04	@	—

COLORS

Blacks (See Compounding Materials)

Blues				
Prussian	lb.	.36	@	.37
Ultramarine	lb.	.15	@	—
Browns				
Mapico	lb.	.13	@	—
Umber, Turkey	lb	.04	@	.04½
Greens				
Chrome	lb.	.21	@	—
Chromium Oxide, bbl.	lb.	.21	@	—
Guignet's Green	lb.	.70	@	—
Reds				
Antimony crimson, 15/17	lb.	.45	@	—
sulfur, free	lb.	.48	@	.60
Indian English	lb.	.09	@	.10
Domestic (Maroon)	lb.	.11	@	—
Red oxide, pure	lb.	.10	@	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼	@	—
Whites				
Cryptone, No. 19	lb.	.05⅝	@	.06⅛
Cryptone CB, No. 21	lb.	.05⅝	@	.06⅛
Cryptone, ZS-20	lb.	.08⅜	@	.08⅝
Cryptone, ZS-86	lb.	.08⅜	@	.08⅜
Lithopone				
Albalith, black label—11	lb.	.04⅛	@	.04⅜
Azolith	lb.	.04⅜	@	.04⅝
Ray-bar	lb.	.05⅞	@	.06⅜
Ray-cal	lb.	.05⅞	@	.06⅜
Rayox	lb.	.16	@	.19
Titanox A	lb.	.15	@	.18
Titanox B	lb.	.05⅝	@	.06⅝
Titanox C	lb.	.05⅝	@	.06⅝
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06¼	@	.06½
Anaconda, lead free	lb.	.06¼	@	.06½
Horsehead Lead Free Brand:				
Special—3	lb.	.06¼	@	.06½
XX Red—4	lb.	.06¼	@	.06½
XX Red—72	lb.	.06¼	@	.06½
XX Red—78	lb.	.06¼	@	.06½
XX Red—103	lb.	.06¼	@	.06½
Kadox, black label—15	lb.	.06½	@	.06¾
Blue label—16	lb.	.06½	@	.06¾
Red label—17	lb.	.06½	@	.06¾
St. Joe, black label	lb.	.06¼	@	.06½
green label	lb.	.06¼	@	.06½
red label	lb.	.06¼	@	.06½
U. S. P—7. bbls.	lb.	.09½	@	.09¾
Zinc Oxide—French Process				
Florence White seal—7 bbls.	lb.	.08½	@	.08¾
Green seal—8	lb.	.08	@	.08¼
Red seal—9	lb.	.07½	@	.07¾
Yellows				
Cadmolith	lb.	.50	@	.55
Chrome	lb.	.14½	@	.15½
Mapico	lb.	.09½	@	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.027	@	.062
Bone, powdered	lb.	.05½	@	.12½
Carbon, compressed	lb.	.0435	@	.0775
uncompressed	lb.	.0435	@	.0775
"Certified"	lb.	—	@	—
Spherons	lb.	—	@	—
"Disperso"	lb.	.027	@	.036
Drop, bbls.	lb.	.05½	@	.14
"Excello," compressed	lb.	.027	@	.0775
"Fumonex"	lb.	.03	@	.07
"Gastex"	lb.	.03	@	.07
Lampblack	lb.	.07	@	.12
"Micronex"	lb.	.027	@	.036
"Supreme"	lb.	.027	@	.0775
Thermatomic—"P 33"	lb.	.04¾	@	.07¾
"Thermax"	lb.	.01¾	@	.05
United "Dixie" & "Kosmos"	lb.	.027	@	.036

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85	@	24.50
Ammonia carbonate, lump	lb.	.10½	@	.12
Asbestine	ton	13.00	@	15.00
Barium carbonate (98-100%)	ton	—	@	—
Barium Dust	lb.	.05	@	.06
Barytes	ton	23.65	@	31.15
Basofor	lb.	.04½	@	—
Bentonite	lb.	.02	@	.03
Blanc fixe dry f.o.b. works	ton	60.00	@	65.00
Calcene	ton	37.50	@	45.00
Catalpo (fact.)	lb.	.02	@	—
Chalk, precipitated				
Suprex white, extra lt.	ton	45.40	@	60.00
heavy	ton	45.00	@	55.00
Clay, Kaolin, domestic	ton	7.50	@	15.00
Aerfloted, Suprex	ton	9.50	@	21.00
Congaree	ton	9.50	@	—
Crown (f.o.b. plant)	ton	9.50	@	—
Dixie	ton	11.00	@	30.00
Dixie, Jr.	ton	9.50	@	29.00
McNamee	ton	9.50	@	22.00
Par	ton	9.50	@	22.00
Witco	ton	9.50	@	—
Cotton Flock	lb.	.11	@	.15
Glues, extra white	lb.	.28	@	.30
medium white	lb.	.14	@	.19
Kalite No. 1	ton	24.00	@	50.00
Kalite No. 3	ton	34.00	@	60.00
"Lime Crest" Industrial Filler No. 100	lb.	—	@	—
Magnesium carbonate	lb.	.07½	@	—
Mica	ton	35.00	@	44.00
Pyrax A	ton	7.50	@	20.00
Rottenstone (powdered)	lb.	.02½	@	.05
Soapstone, powdered	ton	16.00	@	22.00
Starch, powdered	cwt.	2.90	@	4.10
Talc, domestic	ton	17.00	@	20.00
Whiting, commercial	ton	17.00	@	18.00
Columbia Filler	ton	9.00	@	14.00
English Cliffstone	ton	33.00	@	43.00
Witco	ton	6.00	@	—
Wood Flour	ton	20.00	@	25.00
Zinc Carbonate	lb.	—	@	.10¾
Zinc Stearate	lb.	.23	@	—

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00	@	42.00
Black Diamond	ton	27.00	@	—
Genasco, solid (factory)	ton	25.00	@	27.00
Hard Hydrocarbon	ton	22.00	@	42.00
Parmr, solid	ton	25.00	@	—
Pioneer, MR, solid	ton			
Pioneer-granulated	ton			

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50	@	4.00
Rodo #10	lb.	4.50	@	5.00
Curodex 19	lb.	2.75	@	—
Curodex 188	lb.	3.50	@	—
Curodex 198	lb.	4.50	@	—
Para-Dors No. 5145	lb.	2.00	@	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.40	@	—
Darvan (dispersing agent)	lb.	.30	@	.50
Santomerse (dispensing, wetting, penetrating and stabilizing agent)	lb.	.13	@	—
Sunproof	lb.	.35	@	.37½
Sponge Paste	lb.	—	@	.80
Tackol (tackifier)	lb.	.115	@	—
Tonox	lb.	.56	@	.60

SOFTENERS

Acids				
Acetic, 28%, bbls.	100 lb.	2.53	@	2.78
Nitric, 36 degrees	cwt.	5.00	@	6.00
Sulfuric, 66 degrees	ton	15.50	@	16.50
Acids, Fatty				
Laurex	lb.	.12	@	.14
Stearex Beads	lb.	.08	@	.09
Stearic, double pressed	lb.	.12½	@	.13½
Stearite	lb.	.10½	@	.11¾
Alkalies				
Caustic Soda, 76%	cwt.	3.15	@	3.80
Soda Ash, 58%, C.L.	cwt.	—	@	2.35
Oils				
Cycline Oil	gal.	.20	@	—
Degras, bbls.	lb.	.07¾	@	.08
Fluxrite	lb.	.05½	@	.06½
Palm Niger	lb.	.05½	@	.06½
Para-Flux	gal.	.17	@	—
Petrolatum, light	lb.	.03¼	@	.03¾
Pigmentaroil, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
Pine, steam distilled	gal.	.64	@	.69
dest. dist., drums	gal.	.49	@	.50
Rosin Oil, cmpd.	gal.	.40	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rubtack	lb.	.08	@	.10
Seedine, c.l.	lb.	.07¼	@	—
Tackol	lb.	.08½	@	.18
Witco Palm Oil	lb.	.07	@	—
Witco Softener No. 20	gal.	.20	@	—
Woburn No. 8, c.l.	lb.	.06	@	—
Wobonite, c.l.	lb.	.05	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.05½	@	.06½
coal tar	ton	19.00	@	22.00
hardwood	ton	16.00	@	22.50
pine, 200 lb. gr. wt.	bbl.	6.00	@	6.50
Pigmentar, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
R. S. L. Resin	lb.	—	@	—
Retort Pine Tar, drums	ton	20.00	@	26.00
Solvents				
Acetone, pure	lb.	—	@	.06¾
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33	@	.39
Benzene, 90%	gal.	.18	@	.23
Beta-Trichlorethane	gal.	—	@	.20
Bondogen	lb.	.98	@	1.65
Carbon, bisulfide	lb.	.05¼	@	.08
Carbon tetrachloride	lb.	.05½	@	.08
Dichlorethylene	lb.	—	@	.25
Dipentene, cml., drums	gal.	.41	@	.50
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Ethylene dichloride	lb.	.05¼	@	.06¼
Plastogen	lb.	.07¾	@	.12½
Reogen (drums)	lb.	.11½	@	.20
Rub-Sol (f.o.b. Okla.)	gal.	.09	@	—
Trichlorethylene	lb.	—	@	.09½
Turpentine, spirits	gal.	.43	@	.47
dest. dist., drums	gal.	.33	@	.41
Waxes				
Beeswax, white	lb.	.39	@	.45
Carnauba, yellow	lb.	.46	@	.47½
Ceresin, white, dom.	lb.	.08	@	.11
Montan, crude	lb.	.10¾	@	.11¾
Paraffin (c.l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.02¾	@	—
White crude scale 124/126.	lb.	.02¾	@	.03
Refined, 122/127	lb.	.04½	@	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.50	@	2.10
Exel	lb.	1.00	@	1.40
Gel	lb.	.57	@	.77
Hipar	lb.	.65	@	.92
Powder	lb.	.52	@	.73
Resin	lb.	.52	@	.73
Resin D	lb.	.52	@	.73
White	lb.	1.25	@	1.75
Albasan	lb.	.70	@	.75
Antox	lb.	.56	@	—
B. I. L.	lb.	.57	@	.60
Flectol H	lb.	.54	@	—
Flectol White	lb.	1.00	@	—
Flectol B	lb.	.54	@	—
Neozone	lb.	.63	@	—
Oxynone	lb.	.68	@	—
Perflectol	lb.	.67	@	.75
Retardex	lb.	.35	@	.40
Santoflex A	lb.	—	@	—
Santoflex B	lb.	.54	@	—
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.60

MOLD LUBRICANTS

Aresklene	lb.	—	@	—
Cocoa Soapstock	lb.	.06	@	.08
Dipex	lb.	.06	@	.08
Lubrex	lb.	.25	@	.30
Mold Paste	lb.	.18	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rusco, f.o.b. Nitro	lb.	.12	@	.30
Sericite, f.o.b. N. Y.	ton	65.00	@	—
Soap Tree Bark, cut, sifted	lb.	.06	@	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.19	@	—
Black	lb.	.07	@	.11
White	lb.	.08	@	.12
Brown	lb.	.07	@	.11
Neophax	lb.	.10¼	@	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½	@	.15
Sulfur Chloride, yellow (drs.)	lb.	.04	@	—
Sulfur flour,				
Refined, 100% pure (bags)	cwt.	2.50	@	3.65
Commercial (bags)	cwt.	1.60	@	2.35
Telloy	lb.	2.00	@	—
Vandex	lb.	2.00	@	—

STATISTICS OF THE INDUSTRY

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,362	185,060,304	26.71	8,772	5,672,319	28.87	300,590
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.33	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1937:							
Sept.	55,123	22,119,248	17.91	668	280,741	18.76	54,455
Oct.	51,171	20,250,893	17.67	450	172,466	17.13	50,721
Nov.	51,958	19,905,523	17.01	159	66,501	18.72	51,799
Dec.	68,006	24,934,206	16.37	290	91,764	14.14	67,716
1938:							
Jan.	43,984	15,115,732	15.34	325	118,514	16.27	43,659
Feb.	39,380	13,095,429	14.85	305	109,756	16.08	39,075
Mar.	41,592	13,494,654	14.48	646	198,865	13.74	40,946
Apr.	31,042	9,495,476	13.66	250	75,797	13.55	30,792
May	27,229	8,010,250	13.13	528	167,831	14.20	26,701
June	25,983	7,150,115	12.29	399	116,458	13.03	25,584
July	21,771	5,723,381	11.74	420	127,522	13.54	21,351
Aug.	30,798	8,477,231	12.29	432	133,350	13.79	30,366
Sept.	34,383	10,650,107	13.83	803	242,324	13.48	33,580
Oct.	33,449	10,945,896	14.61	621	196,523	14.14	32,828

* Revised.

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1922, however, include both latex and guayule; guayule only is included in 1923. Annual figures for 1922-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,396	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,833	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,094	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1937:								
Sept.	329	90,822	5	2,196	701	214,511	1,901	839,159
Oct.	247	68,178	29	12,090	460	149,516	1,958	844,205
Nov.	251	69,452	29	9,374	593	194,889	2,085	875,074
Dec.	140	34,347	31	11,491	1,325	470,553	1,804	694,164
1938:								
Jan.	538	147,685	23	8,958	598	224,443	1,400	494,242
Feb.	218	60,097	33	11,393	892	355,080	1,684	560,883
Mar.	150	41,518	69	19,454	587	239,271	979	327,844
Apr.	188	50,423	66	25,741	1,265	444,756	889	295,690
May	229	61,756	29	8,806	900	274,652	879	279,502
June	150	41,518	34	11,496	918	276,126	695	214,420
July	223	49,099	51	16,130	869	267,491	634	209,526
Aug.	250	53,285	41	13,637	526	159,784	876	308,573
Sept.	173	37,954	39	13,896	740	225,161	683	235,242
Oct.	126	27,692	45	20,641	614	163,635	876	347,348

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

	Figures on Monthly Basis: 1931*	1932*	1933*	1934*	1935*	1936*	1937*	1938
Jan.	28,640	29,648	22,645	39,190	46,636	48,631	50,879	29,429
Feb.	28,880	31,821	21,392	40,515	42,720	36,841	51,950	23,868
Mar.	32,883	29,505	17,843	47,003	42,153	42,813	54,129	30,487
Apr.	33,418	27,518	25,928	44,853	44,247	52,031	51,859	27,984
May	37,927	30,957	44,074	42,918	41,101	50,612	51,795	28,947
June	38,027	41,475	50,743	40,147	36,156	52,772	51,860	30,629
July	32,030	29,976	49,614	32,553	35,917	48,250	43,703	32,209
Aug.	27,666	23,721	44,428	33,216	38,775	46,777	41,506	38,170
Sept.	23,707	23,847	35,281	30,258	37,086	46,449	43,945	37,823
Oct.	22,342	22,286	31,543	31,253	41,969	49,637	38,754	40,333
Nov.	23,010	23,231	28,831	34,748	42,310	50,433	34,025	
Dec.	21,470	18,015	28,757	36,569	42,474	49,754	29,195	
Tot.	350,000	332,000	401,079	453,223	491,544	575,000	543,600	

* Revised.

Note: Figures for 1931-1937 were revised in May, 1938, and are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	113,078*	23.0*	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	141,486*	24.6*	19,008*
1932	75,608	77,504	23.4	16,354	1937	178,776	157,990	29.1	26,260

	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks*		Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1937:									
Jan.*	15,129	14,450	28.4	18,822	July	16,241*	12,128*	27.8*	17,682*
Feb.*	15,192	14,578	28.1	18,490	Aug.	16,543*	13,227*	31.9*	19,706*
Mar.*	14,462	15,601	28.9	16,450	Sept.	16,410	13,681	37.4	21,597
Apr.	13,884	15,607	30.1	14,046	Oct.	15,849	12,234	31.6	23,572
May	15,793	14,693	28.4	14,647	Nov.	12,406	9,703	28.6	24,620
June	16,052	14,414	27.8	14,535	Dec.	10,815	7,674	26.3	26,260
1938:									
Jan.	8,467	6,673	22.7	27,179	July	7,109	8,273	25.7	18,832
Feb.	6,012	6,867	28.8	26,431	Aug.	10,472	10,732	28.1	17,892
Mar.	6,669	8,573	27.1	24,401	Sept.	12,016	11,281	29.8	18,127
Apr.	6,399	7,480	26.7	23,339	Oct.	13,558	11,803	29.3	19,090
May	6,866	8,009	27.7	22,275	Nov.	....	.....	...	.....
June	7,584	8,274	27.0	21,040	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1936 were revised on June 1, 1937, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)

(In Thousands of Barrels of 42 Gallons)

	1936*	1937*	1938		1936*	1937*	1938
January	32,344	33,668	35,176	August	46,061	49,598	50,459
February	27,178	32,034	31,861	September	44,366	47,515	46,058
March	35,864	40,524	41,259	October	44,163	45,446	46,272
April	38,864	43,461	43,254	November	39,954	42,718	
May	42,010	45,407	44,911	December	39,590	39,465	
June	44,522	48,447	48,293				
July	46,865	51,069	47,474	Total	481,606	519,352	

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,300	1935	18,664,356
1928	24,247,282	1932	6,261,336	1936	20,790,192
1929	24,141,502	1933	8,713,962	1937	22,257,964

1938		1938		1938	
January ...	527,899	May	706,188	September .	819,089
February ..	477,600	June	527,121	October ...	1,312,094
March	854,031	July	466,419	November ..	.....
April	970,545	August	467,506	December ..	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market. in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1936																																
Aug.																																
Sept.																																
Oct.																																
Nov.																																
Dec.																																
1937																																
Jan.																																
Feb.																																
Mar.																																
April																																
May																																
June																																
July																																
August																																
Sept.																																
Oct.																																
Nov.																																
Dec.																																
1938																																
Jan.																																
Feb.																																
Mar.																																
April																																
May																																
June																																
July																																

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1911-1930

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	**37.72**
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	**22.48**
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	**20.55**
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	**11.98**

Average Monthly Price per Pound Since 1930

	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents
Jan.	8.34	4.38	3.08	9.32	13.10	14.35	21.37	**14.63**
Feb.	7.70	4.03	2.95	10.45	12.92	15.48	21.33	**14.71**
Mar.	7.71	3.35	3.01	11.01	11.51	15.89	24.09	**13.55**
Apr.	6.43	3.02	3.56	12.10	11.55	15.98	23.44	**11.84**
May	6.49	3.09	4.95	13.26	12.05	15.62	21.14	11.57
June	6.35	2.66	6.15	13.51	12.57	15.85	19.29	12.57
July	6.37	2.89	8.01	14.60	12.10	16.49	18.86	15.37
Aug.	5.38	3.63	7.31	15.47	11.98	16.25	18.37	16.08
Sept.	5.08	3.84	7.30	15.36	11.55	16.46	18.55	16.15
Oct.	4.87	3.65	7.64	13.96	12.62	16.55	16.28	16.89
Nov.	4.65	3.44	8.66	13.04	13.15	17.97	14.60	16.24
Dec.	4.64	3.24	8.87	12.98	13.28	20.01	15.41	
Average for Year	6.17	3.49	5.96	12.92	12.37	16.41	19.39	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1938 Sept.	1938 Oct.	1938 Nov.	1938 Dec.	Day	1938 Sept.	1938 Oct.	1938 Nov.	1938 Dec.
1	7 7/8		8 1/4	8	17		8 1/2	7 13/16	
2	7 7/8		8 1/4	7 13/16	18		8 3/8	7 1/2	
3		8 3/8	8 1/16	7 13/16	19	7 13/16	8 3/8	7 7/8	
4		8 1/16	8 3/8		20	8 1/16	8 1/16		
5	7 7/8	8 1/4	8 1/16	7 13/16	21	8 1/8	8 3/8	7 13/16	
6	7 15/16	8 3/8		7 13/16	22	7 15/16	8 3/8	7 13/16	
7	7 15/16	8 1/8	8 1/4	7 13/16	23	7 7/8		7 13/16	
8	7 7/8	8 3/8	8 1/4	7 13/16	24		8 3/8	7 13/16	
9	7 13/16		8 3/8	7 13/16	25		8 3/8	8	
10		8 1/16	8 1/8	7 13/16	26	7 5/8	8 1/4	8	
11		8 1/16	8 1/8		27	7 5/8	8 3/8		
12	8 1/16	8 3/8	8 1/8		28	7 7/8	8 1/8	7 7/8	
13	8	8 1/16			29	7 3/4	8 1/16	7 13/16	
14	7 13/16	8 1/2	8 1/16		30	8 1/8		7 13/16	
15	8 1/16	8 1/2	8 1/16		31		8 1/16		
16	7 15/16		8 1/16						

Average Monthly Price Per Pound

Month	1935 Pence	1936 Pence	1937 Pence	1938 Pence	Month	1935 Pence	1936 Pence	1937 Pence	1938 Pence
Jan. ...	6.434	6.758	10.378	7.077	Aug. ...	5.696	7.581	8.830	7.841
Feb. ...	6.292	7.255	10.503	7.029	Sept. ...	5.508	7.577	8.935	7.918
Mar. ...	5.745	7.450	11.766	6.590	Oct. ...	6.130	7.898	7.855	8.355
Apr. ...	5.604	7.502	11.471	5.793	Nov. ...	6.308	8.572	7.080	8.111
May ...	5.822	7.335	10.250	5.632	Dec. ...	6.340	9.580	7.332	
June ...	6.027	7.352	9.548	6.147	Average				
July ...	5.801	7.696	9.136	7.464	for Year	5.976	7.713	9.424	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1938 Oct.	1938 Nov.	1938 Dec.	Date	1938 Oct.	1938 Nov.	1938 Dec.	Date	1938 Oct.	1938 Nov.	1938 Dec.
1	8.25	9.01	8.95	11	8.55			22	8.75	9.11	
2		9.01	8.75	12		9.27		23		9.06	
3	8.30	8.94	8.59	13	8.55			24	8.75		
4	8.35	8.87		14	8.55	9.36		25	8.75	9.08	
5	8.40	8.88	8.60	15	8.55	9.28		26	8.80	9.04	
6	8.45		8.69	16		9.27		27	8.80		
7	8.50	8.94	8.72	17	8.55	9.34		28	8.88	8.96	
8	8.50		8.66	18	8.55	9.30		29	8.93	8.98	
9		9.06	8.57	19	8.55	8.97		30		8.96	
10	8.50	9.18	8.68	20	8.70			31	9.01		
				21	8.75	9.08					

Average Monthly Price Per Pound

	1935 Cents	1936 Cents	1937 Cents	1938 Cents		1935 Cents	1936 Cents	1937 Cents	1938 Cents
Jan. ...	12.70	11.91	13.06	**8.57**	Aug. ...	11.48	12.28	10.41	**8.41**
Feb. ...	12.58	11.53	13.15	**8.91**	Sept. ...	10.80	12.31	9.02	**8.17**
Mar. ...	11.63	11.43	14.46	**8.92**	Oct. ...	11.28	12.30	8.42	**8.61**
Apr. ...	11.73	11.71	14.23	**8.76**	Nov. ...	12.01	12.23	7.96	**9.08**
May ...	12.25	11.68	13.34	**8.50**	Dec. ...	11.99	12.83	**8.26**	
June ...	11.89	12.02	12.70	**8.38**	Average				
July ...	12.26	13.11	12.26	**8.85**	for Year	11.88	12.11	**11.44**	

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1936	ON HAND 1937	ON HAND 1938	AFLOAT 1936	AFLOAT 1937	AFLOAT 1938	ON HAND AND AFLOAT 1936	ON HAND AND AFLOAT 1937	ON HAND AND AFLOAT 1938
Jan.	296,683	204,436	274,581	43,870	55,096	57,356	340,553	259,532	331,937
Feb.	293,631	195,692	294,338	46,532	53,538	47,459	340,163	249,230	341,797
Mar.	284,561	192,980	299,172	58,935	56,994	41,882	343,496	249,974	341,054
Apr.	277,478	176,289	301,436	47,678	72,530	39,071	315,156	248,819	340,507
May	262,415	175,273	299,720	48,860	58,542	32,859	311,275	233,815	332,579
June	245,544	172,056	294,566	47,228	57,215	32,079	292,872	229,271	326,645
July	235,850	167,094	284,914	60,343	75,779	40,400	296,193	242,873	325,314
Aug.	230,167	174,195	277,463	63,597	80,439	47,772	293,764	254,634	325,235
Sept.	233,336	186,193	276,586	62,240	83,288	48,927	295,576	269,481	325,513
Oct.	224,000	200,025	269,937	67,825	80,653	51,062	291,825	280,678	320,999
Nov.	211,480	222,707		73,691	81,302		285,171	304,009	
Dec.	223,000	262,204		56,567	63,099		279,567	325,303	

* Revised.

STOCKS IN GREAT BRITAIN

(No of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1936	London 1937	London 1938	Liverpool 1936	Liverpool 1937	Liverpool 1938
January	84,791	29,005	40,203	77,188	41,895	21,711
February	79,757	26,508	46,596	77,138	37,078	24,737
March	74,779	21,292	50,233	72,823	30,622	26,220
April	68,932	21,128	54,296	71,388	27,443	28,277
May	61,349	21,351	57,194	69,150	25,081	29,862
June	55,993	21,964	60,307	66,173	21,258	31,837
July	49,575	22,589	62,236	63,715	19,424	32,825
August	45,749	25,211	65,113	62,367	19,817	34,315
September	44,364	28,462	63,321	59,485	21,190	34,645
October	40,777	30,465	59,609	55,738	21,327	33,483
November	37,495	33,304		51,184	21,399	
December	33,027	35,633		45,291	21,978	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [2]	Holland	Para and Manaos
At end of 1937					
November	38,778	45,854	5,378	105	2,901
December	44,792*	45,734	5,632	100	1,771*
At end of 1938					
January	48,494*	49,643	5,976	131	2,024
February	46,241	47,990	5,653	169	2,342
March	50,797	48,473	5,490	180	1,212
April	40,614	45,008	4,812	155	1,083
May	40,598	45,426	4,876	169	816
June	44,729	49,290	4,488	190	904*
July	45,529	52,081	5,014	711	944
August	41,002	49,922	4,659	672	1,032
September	35,386	53,815	5,339	662	1,599

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

End of:	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
1937				
August	80,439	40,300	19,261	140,000
September	83,288	37,400	20,312	141,000
October	80,653	35,000	19,347	135,000
November	81,302	39,100	6,598	127,000
December	63,099	45,100	26,801	135,000
1938				
January	57,356	40,500	15,144	113,000
February	47,459	44,200	16,341	108,000
March	41,882	44,700	22,418	109,000
April	39,071	42,960	31,969	114,000
May	32,859	40,600	20,541	94,000
June	32,079	42,580	17,341	92,000
July	40,400	39,150	25,450	105,000
August	47,772	34,500	18,728	101,000
September	48,927	30,000	17,073	96,000
October	51,062	30,000	17,938	99,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P—Preliminary estimate.

TOTAL PRINCIPAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1933	1934	1935	1936*	1937	1938
January	634,797	661,948	698,153	600,479	454,249*	551,632*
February	626,227	663,308	686,195	599,355	445,265*	569,242*
March	638,428	666,382	678,809	583,318	447,856*	591,968
April	629,159	658,796	677,006	567,172	428,249*	593,340
May	626,537	689,230	677,569	541,871	413,134*	577,063*
June	613,055	672,804	671,525	520,255	434,250*	583,952
July	618,258	676,200	679,061	519,074	445,782	593,481
August	617,449	674,702	680,644	500,520	457,462*	580,489*
September	623,683	694,361	661,509	493,585	470,768*	568,902*
October	636,597	680,616	655,000	486,159	479,398*	560,948
November	642,968	684,408	617,300*	466,491	493,266*	
December	654,890	705,975	613,987*	466,576	545,533*	
Monthly Avge.	630,171	677,395	666,397*	528,738	460,022*	

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis — Quarter	1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	12,323	11,004	6,635	13,437	13,355	11,798	16,142	7,71•
Apr.-June	16,295	12,980	14,412	13,565	12,597	15,443	16,421	8,570
July-Sept.	12,004	9,245	14,707	9,822	11,312	15,467	12,659	11,416
Oct.-Dec.	8,117	6,856	9,550	10,406	12,099	15,409	10,063	
Total	48,739	40,085	45,304	47,230	49,363	58,117	55,285	

Shipment Figures on Quarterly Basis — Quarter	1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	11,268	8,760	6,981	10,730	11,154	10,944	14,667	7,716
Apr.-June	15,919	18,021	15,139	14,998	13,473	16,530	16,324	10,745
July-Sept.	14,354	8,141	13,707	11,648	13,489	14,558	13,591	11,936
Oct.-Dec.	8,510	5,329	8,265	9,310	12,066	13,331	10,864	
Total	50,051	40,251	44,092	46,686	50,182	55,363	55,446	

Inventory Figures [2] — Quarter	1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar	10,014	9,878	7,290	11,651	11,675	9,087	12,488	10,808
Apr.-June	10,447	4,999	6,615	10,219	10,755	7,835	12,529	8,763
July-Sept.	8,158	6,096	7,595	8,419	8,288	9,012	11,615	8,406
Oct.-Dec.	7,775	7,644	8,888	9,455	8,196	11,114	10,767	

Figures for Recent Months

	PRODUCTION 1936	PRODUCTION 1937	PRODUCTION 1938	SHIPMENTS 1936	SHIPMENTS 1937	SHIPMENTS 1938	INVENTORY [2] 1936	INVENTORY [2] 1937	INVENTORY [2] 1938
Oct.	5,126	3,985	4,276	4,082	3,951	4,285	10,096	11,644	8,519
Nov.	4,972	3,120		4,233	3,777		10,823	10,963	
Dec.	5,311	2,959		5,016	3,156		11,114	10,768	

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis — Quarter	1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	11,989	10,721	6,230	12,823	12,553	11,935	15,714	6,938
Apr.-June	15,388	11,913	13,001	13,191	11,631	14,678	15,299	7,177
July-Sept.	12,839	8,286	14,356	10,321	11,270	15,377	11,949	10,462
Oct.-Dec.	8,117	5,970	9,000	9,891	12,425	15,257	9,024	
Total	48,333	36,890	42,587	46,226	47,879	57,247	51,986	

Shipment Figures on Quarterly Basis — Quarter	1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	11,251	8,918	6,539	10,640	11,252	11,410	14,498	6,969
Apr.-June	15,314	16,271	13,292	14,553	11,928	15,169	15,381	9,301
July-Sept.	15,282	7,761	13,370	11,545	13,251	15,125	12,805	10,541
Oct.-Dec.	8,174	4,961	8,189	8,306	11,636	12,921	9,693	
Total	50,021	37,911	41,390	45,044	48,067	54,625	52,377	

Inventory Figures [2] — Quarter	1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	10,475	9,448	6,369	10,244	10,406	8,692	11,904	10,093
Apr.-June	10,504	5,174	6,097	8,795	10,050	8,105	11,746	8,108
July-Sept.	8,095	5,753	7,008	7,639	7,565	8,627	11,242	7,907
Oct.-Dec.	7,922	6,749	7,815	9,180	8,231	10,985	10,235	

Figures for Recent Months

	PRODUCTION 1936	PRODUCTION 1937	PRODUCTION 1938	SHIPMENTS 1936	SHIPMENTS 1937	SHIPMENTS 1938	INVENTORY [2] 1936	INVENTORY [2] 1937	INVENTORY [2] 1938
Oct.	5,397	3,772	3,870	4,108	3,499	4,067	9,977	11,103	7,629
Nov.	4,739	2,870		3,995	3,334		10,732	10,527	
Dec.	5,121	2,382		4,819	2,859		10,985	10,236	

[1] Based on reports received from the Rubber Manufacturers Association.
[2] Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937*	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938							
Apr.	219,314	176,078	43,236	18,819	14,033	4,786	238,133
May	192,068	154,958	37,110	18,115	13,641	4,474	210,183
June	174,667	136,531	38,136	14,732	11,014	3,718	189,399
July	141,437	106,841	34,596	9,007	5,273	3,734	150,444
Aug.	90,484	58,624	31,860	6,452	3,063	3,389	96,936
Sept.	83,534	65,159	18,375	6,089	4,290	1,799	89,623
Oct.	209,522	187,494	22,028	5,774	5,412	362	215,296
Nov.	.....	.....	.....	.....	.....	.....	.....
Dec.	.....	.....	.....	.....	.....	.....	.....

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								NETHERLAND INDIES [4]						
	Gross Exports	Imports	Net Exports	Ceylon [2]	India & Burma [3]	Sarawak [3]	British North Borneo [3]	Siam [3]	Java & Madura	Sumatra E. Coast	Other N. I.	Indo-China [3]	Amazon Valley	All Other [3]	World Total [6]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	37,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,737	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	38,962	9,874	9,155	8,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,294	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	35,551	83,978	125,969	208,699	43,387	15,576	12,721	1,120,576
1937:															
June	54,809	23,614	31,195	5,149	1,092	1,890	813	2,933	8,269	12,290	24,804	3,673	762	945	93,815
July	71,863	26,100	45,763	6,279	966	2,543	1,414	3,175	7,512	11,557	23,520	5,563	854	1,416	110,562
Aug.	64,525	21,395	43,130	7,308	605	1,624	1,189	2,999	6,785	11,563	21,014	2,277	1,248	1,283	101,025
Sept.	67,414	19,065	48,349	5,804	1,092	2,659	969	3,173	6,402	10,862	19,611	4,131	1,007	1,145	105,204
Oct.	59,319	11,858	47,461	6,701	1,248	523	1,505	2,352	6,587	12,172	14,188	3,753	1,434	1,147	99,071
Nov.	57,850	12,396	45,454	4,391	2,135	2,517	1,327	2,549	6,310	10,003	11,596	4,556	963	1,037	92,838
Dec.	56,791	13,949	42,842	9,529	2,708	3,009	1,172	2,957	9,108	12,272	11,731	5,384	2,011	1,032	103,755
1938:															
Jan.	47,986	17,078	30,908	5,222	1,379	3,485	1,307	2,897	4,476	9,283	12,501	6,088	878	1,400*	79,824
Feb.	48,899	11,874	37,025	5,216	1,423	8	918	3,266	6,391	8,793	12,023	3,070	1,542	1,400*	81,058
Mar.	49,197	15,813	33,384	3,834	1,247	1,564	853	2,837	5,668	10,156	15,284	3,213	1,831	1,200*	80,209
Apr.	53,864	9,158	44,706	1,951	1,347	1,728	1,158	1,583	5,967	10,081	12,274	3,647	1,004	1,200*	86,644
May	38,245	10,325	27,920	2,833	1,283	1,648	815	2,507	4,575	7,515	9,741	3,118	1,053	1,200*	64,208
June	42,258	14,394	27,864	3,693	1,318	2,441	643	3,906	4,519	7,788	11,899	4,776	718	1,200*	70,765
July	43,689	18,713	24,976	3,861	1,083	2,057	937	4,707	6,808	8,271	19,765	5,139	625	1,200*	79,429
Aug.	47,246	13,735	33,511	4,401	953	965	728	4,793	4,757	7,329	10,912	3,840	1,050*	1,200*	74,439
Sept.	40,992	10,586	30,406	4,023	1,036	756	284	3,893	4,026	7,052	9,038	8,139	750*	1,200*	70,603
Oct.	42,294	16,599	25,695	4,870	1,095	1,612	1,075	5,040	4,486	8,229	17,088	3,637	1,575*	1,200*	75,602
Nov.	39,340	10,219	29,121												

All figures from January, 1934, onward are net exports shown on a "dry rubber" basis as calculated by the International Rubber Regulation Committee. (1) Prior to January, 1934, Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex also is not included in the early years, which on a dry rubber basis was as follows: 1924—1,117 tons; 1925—3,618; 1926—3,263; 1927—2,439; 1928—2,247; 1929—3,574; 1930—2,750; 1931—1,940; 1932—5,193; 1933—10,470, and 1934—14,172 tons. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments on a dry rubber basis were: 1923—18 tons; 1924—90; 1925—6; 1926—20; 1927—½; 1928—1; 1929—2; 1930—11; 1931—2; 1932—2; 1933—1, and 1934—6 tons. (3) Official statistics. (4) Exports from "Other N. I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included in earlier years, which is as follows on a dry rubber basis: 1923—2,342 tons; 1924—1,008; 1925—2,239; 1926—44; 1927—84; 1928—1,395; 1929—437; 1930—2,744; 1931—3,874; 1932—3,488; 1933—5,260, and 1934—5,330 tons. (5) Calculated from official import statistics of principal consuming countries; also includes United States imports of guayule. (6) This total includes the third column for British Malaya and all other figures shown for other territories. (*) Figure is provisional.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	28,904	19,164	14,970	4,343	4,680	2,400	13,063	1,063,798
1937:															
June	48,972	5,157	6,010	6,469	3,791	7,608	1,958	3,940	2,226	1,630	521	1,802	200*	1,150	91,434
July	43,018	10,628	4,306	7,860	1,946	4,851	2,719	2,150	1,902	851	497	1,409	200*	753	83,090
Aug.	49,485	15,757	4,488	8,752	3,506	4,409	2,569	1,226	2,153	1,013	382	1,386	200*	1,692	97,018
Sept.	56,685	15,671	4,820	10,595	2,396	3,666	1,941	1,391	3,184	1,258	337	1,648	200*	1,369	105,161
Oct.	52,926	11,899	4,278	8,076	5,998	2,059	951	2,500*	2,470	967	367	1,535	200*	988	95,214
Nov.	54,135	12,878	4,311	8,848	4,787	1,368	2,857	2,500*	1,935	925	313	970	200*	846	96,873
Dec.	69,660	10,655	5,736	9,580	2,619	1,995	1,976	2,500*	767	1,286	318	1,008	200*	1,890	110,190
1938:															
Jan.	45,596	15,458	4,769	6,314	1,789	4,935	1,857	2,693	574	1,257	300	1,239	200*	1,102	86,083
Feb.	40,977	16,505	5,456	6,959	615	3,173	2,053	2,341	578	974	534	1,114	200*	1,771	82,843
Mar.	42,075	15,911	4,845	10,768	2,123	6,222	1,365	2,162	1,043	961	342	1,088	200*	1,324	90,429
Apr.	31,870	14,653	5,757	6,497	999	5,456	2,397	4,281	640	904	449	971	200*	920	75,994
May	27,809	14,675	5,169	9,595	2,545	3,328	2,422	4,163	1,041	1,137	419	1,283	200*	957	74,743
June	26,429	14,053	4,542	7,460	3,243	2,145	2,399	505	805	853	663	1,149	200*	988	65,434
July	22,209	12,678	5,433	6,927	2,685	3,100	3,641	541	1,215	1,106	526	1,151	200*	635	62,047
Aug.	31,494	12,891	3,662	7,190	1,832	2,034	2,045	739	1,182	1,238	259	965	200*	595	66,326
Sept.	34,436	8,100	5,094	7,390	1,405	3,586	1,832	1,000*	1,588	514	385	1,830	200*	608	67,968
Oct.	33,830	3,085	3,791	6,326				....	1,708	....	420	....	....	....	....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE: THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials —

ACCELERATORS—
El-Sixty, Ureka C, Guantal, Ureka, A-1, A-10, A-19, A-32, A-100, Pipsolene, Pip-Pip, DPG, R-2.
ANTIOXIDANTS — Flectols B, H, White.
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Bldg., Akron, Ohio

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 26 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

CARBON BLACK—*Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

RATES
for Listings in this Section
●
$5.00 per listing per month.
10% Discount if 2 listings per month are used.
15% Discount for 3 or more listings per month.
Copy Subject to Style Regulations.
No cuts accepted.

CARBON BLACK
CONTINENTAL
The Newest Name in Carbon Black offers
CONTINENTAL DUSTLESS
CONTINENTAL COMPRESSED
CONTINENTAL UNCOMPRESSED
Continental Carbon Company
295 Madison Ave., New York, N.Y.

CARBON BLACK— *Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Grant Building, Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
Wishnick-Tumpeer, Inc.
295 Madison Ave., New York, N.Y.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

CHEMICALS

For Rubber	For Industry Generally	
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Div. of U. S. Rubber Products, Inc.
1790 BROADWAY NEW YORK

CHEMICALS AND MINERAL
Ingredients—Whiting, Clay, Talc, Barytes, Colors, Heavy Calcined Magnesia, Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosenbank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Building
Akron. Ohio

THE MARKET PLACE Section Continued on Next Page